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PULMONARY RESECTION FOR SOLITARY METASTATIC SARCOMAS AND CARCINOMAS

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THE appearance of a presumed solitary metastatic lesion in a lung months or years after the apparent complete removal of a primary extrapulmonary sarcoma or carcinoma is far from rare. If untreated surgically, these patients almost invariably[1] die, usually from the invasive, infectious or pressure effects of enlargement of the original metastatic lesion and from other metastases. A search of the literature reveals only 5[2] case histories (4 additional cases were merely mentioned by Churchill) in which both the primary and the metastatic pulmonary lesions have been removed. The first record is that of Barney and Churchill, their patient being alive and well 12 years after removal of the metastatic lesion. The present report includes 19 additional case histories from various clinics which have not been published previously. Of the 24 patients, 11 have had recurrence of their neoplasms, 1 died as a direct result of operation, and 12 are apparently free from recurrence. Among the latter, however, are 4 whose pulmonary resection operations were performed less than a year ago; in 8 the operations were performed more than a year ago, namely, 12, 7, 6, 5, 4, 3, 1¼ and 1 years ago, respectively.

An operation performed to remove a metastatic malignant neoplasm that is assumed to be a solitary one (because no other can be found at the time) is obviously a gamble. As there is some chance of success, and as failure to remove the lesion surgically will result in the death of the patient, the operation needs no other justification.

The appearance of an x-ray shadow of a tumor in a lung at the time of, or months or even years after, the removal of a malignant lesion from some other part of the body is prima facie evidence that the pulmonary tumor is a metastatic one. The chance of this being so is especially great if the tumor has sharply defined margins and if it is round. Nevertheless, the pulmonary tumor may be primary and either malignant or benign. In many of the collected cases and in the University of Michigan Hospital patients H.A.B. and V.A.B., the surgeons could not determine before operation whether the pulmonary lesion was primary or metastatic and in several instances mistakenly believed them to be primary.

The presence of a bronchoscopically visible neoplasm is not proof that the lesion is primary in the lung since enlarging metastatic neoplasms not infrequently penetrate a bronchial wall or the metastasis may have first lodged in a bronchial wall. The histopathology of a bronchoscopic biopsy specimen usually indicates whether the lesion is metastatic to the lung or primary there. The presence or absence of pulmonary symptoms is of little or

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[1]Spontaneous disappearance of metastases has been reported.
[2]See footnote, No. 3.

no value in the differentiation between primary and metastatic pulmonary lesions since both may be symptomless when small or not involving a large bronchus, and both may produce symptoms when large or involving a large bronchus.

The most important criteria for the surgical removal of a presumed solitary pulmonary metastatic lesion are:

1. A thorough physical and x-ray examination shall have discovered no other metastasis. Such an examination should include careful palpation for enlargement of lymph nodes and liver and for tumors in the skin, bones, and all palpable organs. The chest x-ray examination should include stereoscopic posteroanterior projection films and lateral or oblique projections, as well as fluoroscopy in all standard projections. X-ray films of the skull and all the long bones may be worth making.

2. Reasonable assurance should be had that the primary neoplasm has been completely removed. This is given if the primary neoplasm was removed 3 or more years before the contemplated pulmonary operation without the signs or symptoms of recurrence. In doubtful cases (e.g., see below, Case Reports, University of Michigan Hospital, patients L.H.W. and A.B.) an exploratory operation and removal of a biopsy specimen may be advisable.

3. The patient must be in sufficiently good general condition for the contemplated pulmonary operation and, with regard to pulmonary function, able to spare a lung, a lobe or a part of a lobe, the extent of the resection depending upon the extent and location of the neoplasm.

The length of time that has passed between the complete removal of the primary neoplasm and the appearance of the presumed solitary metastatic lesion in a lung is important with regard to the validity of an assumption that the single demonstrable metastasis is actually the only one. If only one metastatic lesion (especially if it is a large one) can be found several years after the primary lesion has been removed, there is probably a better chance that no other metastases exist than if the metastatic lesion were found shortly before or after removal of the primary lesion because, in the latter instance, relatively little time has passed for the development of other metastases. This argument, however, is not wholly sound and not always applicable since the late appearance of a single small metastasis strongly suggests that it has been dormant or of a low grade of malignancy and, therefore, that if other metastases are present they, too, may be small and not yet clinically demonstrable because of the absence of symptoms and physical and x-ray signs. The lung, owing to its radiotranslucency, is a particularly favorable organ for the very early detection of a metastasis, perhaps before metastases in other organs can be found. It should be noted, however, that the discovery of a single pulmonary metastasis soon after, or even before, the removal of the primary neoplasm does not necessarily indicate that other metastases will appear later. With due allowance for the exceptions mentioned, however, the late appearance of a single metastasis offers a better chance that other metastases are not present than if the single metastasis appeared early.

When one or more metastases appear subsequent to the removal of a presumed solitary pulmonary metastasis, they may have arisen from the primary neoplasm before it was removed, from some other metastasis that has not been detected or, if the primary neoplasm had not been completely removed, they may have come from it after the pulmonary resection operation. When one or more metastases appear within a few weeks or months after the removal of the original pulmonary metastasis, especially in cases in which one or more years have intervened between the removal of the primary neoplasm and the first symptoms or signs of the first metastatic lesion, it is likely that these are second generation metastases and had their source in the original metastatic lesion. Pathologists not rarely find that the neoplastic cells of the pulmonary tumor which has been removed had penetrated its capsule or had traversed a blood vessel wall; such unfavorable events are probably most likely to occur in tumors that have grown to a large size or that are composed of cells of relatively great malignancy.

As trauma of the tumor at the time of operation might be the determining factor in the dissemination of neoplastic emboli, unusual

gentleness should be used in the handling of the lung and, preferably, the pulmonary veins should be ligated as early in the operation as possible. Since the chance of dissemination of the neoplasm from the original metastasis probably increases with growth of the tumor, it should be removed as soon as possible, and the temptation avoided of postponing a decision about operation while waiting to learn if later examinations of the patient might reveal other metastases.

The number of known cases in which a primary neoplasm and its pulmonary metastatic lesion have been removed is too small to determine the truth regarding the theoretical considerations discussed in the last three paragraphs or to justify the drawing of other conclusions from Table I. The 2 patients in whom the longest period elapsed between the removal of the primary neoplasm and the first symptom or sign of a pulmonary metastasis, namely, 10 and 13 years, respectively, had recurrences following resection of the original pulmonary metastasis.

Among the 24 cases there were 16 carcinomas and 8 sarcomas. Six of the 8 sarcomas, but only 6 of the 15 carcinomas (excluding a carcinoma patient who died as a result of operation) are apparently free of recurrence. One of the sarcomas and 2 of the carcinomas, however, were operated upon less than 4 months ago, and another sarcoma patient only 9 months ago. Four out of 6 renal cell carcinoma patients (including 1 operated upon a month ago) are free of recurrence. Only 2 other carcinoma patients are free of recurrence, 1 for 3 years and the other for 3½ months after pulmonary resection.

Only 1 of the 24 patients died as a direct result of operation. Safe operation, however, is of only incidental importance with regard to the subject of this article; freedom from recurrence 1 year, 3 years and especially 5 years after the pulmonary resection operation is, of course, of major importance; 4 patients (see Table I) in whom no recurrence appeared within 1 year after the pulmonary operations, are included in this article only because all known patients in whom both the primary and metastatic lesions have been removed are included. No patient is included whose pulmonary lesion was removed first in the mistaken belief that it was a primary neoplasm, if the true primary neoplasm was not later removed. Occasionally, two metastatic lesions have been removed by a single lobectomy or pneumonectomy operation; there are only two records known to us in which a second metastatic pulmonary lesion was removed by a subsequent pulmonary resection operation (University of Michigan Hospital patient L.H.W., and a patient mentioned by Churchill for whom bilateral partial lobectomy operations were performed). In all 24 cases the histopathologic examination of the pulmonary lesions indicated that these lesions were metastatic rather than primary in the lung.

The following reports include all cases of pulmonary resection for metastatic neoplasms (before or after removal of the primary neoplasm) we have been able to collect from publications (5 cases),[3] by casual inquiry among surgeons but not by systematic questionnaires (13 cases) and from the University of Michigan Hospital (6 cases), with the exception of 4 cases briefly mentioned in a table presented by Churchill in a 1940 article; 1 of Churchill's patients had a bilateral partial lobectomy, 2 had total lobectomy, and 1 had total pneumonectomy; the only other information given about these patients is that there were no hospital deaths; a fifth patient, listed in Table I, is the one appearing below under "Barney and Churchill." Almost certainly there are a considerable number of unpublished cases of which we have not heard. Dr. Alfred Blalock, Dr. Duane Carr, Dr. O. T. Clagett, Dr. F. S. Dolley, Dr. Stuart W. Harrington, Dr. Paul C. Samson, and Dr. Richard H. Sweet have generously sent us the unpublished histories of their patients with permission to use them in this article.

CASE REPORTS[4]

Well 12 years after partial lobectomy, which was 15 months after nephrectomy for carcinoma.

[3]Since this article was prepared we have seen an article by Mandeville (see References) in which 4 cases are reported in which both the primary and solitary metastatic pulmonary lesions were removed. One patient died during a pneumonectomy and 2 died from secondary metastases within a year after pneumonectomy. The prognosis in the fourth patient is grave because a large group of cancerous lymph nodes was found in the pulmonary hilum at the time of the recent pneumonectomy.

[4]The cases are arranged in chronological order with regard to the dates of their pulmonary resection operations.

TABLE I.—SIGNIFICANT DATA ABOUT THE 24 KNOWN PATIENTS WHO HAVE HAD PULMONARY RESECTION FOR METASTATIC NEOPLASMS

Patients of	Kind of neoplasm and site of the primary lesion	First symptom or sign of metastasis after removal of primary		Pulmonary resection after removal of primary		No sign or symptom of recurrence since pulmonary resection		First symptom or sign of recurrence after pulmonary resection		Death after pulmonary resection	
		Years	Months	Years	Months	Years	Months	Years	Months	Years	Months
Barney and Churchill	Renal cell carcinoma	Metastasis discovered first		1	3	12					
Frank S. Dolley	Carcinoma of mandible	9		9	4						1/10
Univ. of Mich. Hosp., L.H.W.*	Neurogenic sarcoma of ulnar nerve	1	½	1 2	1 1¾	6	2		7		
Richard H. Sweet, No. 1	Sarcoma of breast	4		4		7					
Forrester Raine	Carcinoma of sigmoid		9	1	9				3		
Tinney and McDonald (and S. W. Harrington)	Renal cell carcinoma	2		3	1	4	11				
Univ. of Mich. Hosp., A.B.	Myogenic sarcoma of thigh	1	7	1	9	4					
Richard H. Sweet, No. 2	Carcinoma of ovary	10		10				1		1+	
Brezina and Lindskog	Carcinoma of uterus	13		13½				1	5+	1	11½
Alfred Blalock	Carcinoma of rectum	3	7	4	6	3	1				
Duane Carr	Osteogenic sarcoma of thigh	4	1	4	10				5+		10
Deming and Lindskog†	Carcinoma of bladder and urethra	8	to 9	8½	to 15				2		5½
S. W. Harrington	Carcinomatous teratoma of testis		11	1	3			1	6	2	
Richard H. Sweet, No. 3	Fibrosarcoma of thoracic wall	2	2	2	2		9				
Richard H. Sweet, No. 4	Renal cell carcinoma		¾		¾	1	3				
Richard H. Sweet, No. 5	Renal cell carcinoma		2		2				1½	Date of death unknown	
Univ. of Mich. Hosp., R.L.L.	Fibrosarcoma of thigh	2		2	5	1	1				
O. T. Clagett, No. 1	Carcinoma of rectum	4	4	4	4				8		
Richard H. Sweet, No. 6	Renal cell carcinoma	2		2					9		
Univ. of Mich. Hosp., H.A.B.	Carcinoma of rectum	4		6					3		5
O. T. Clagett, No. 2	Chondrosarcoma of os calcis	4	3	4	5		¾				
Univ. of Mich. Hosp., I.L.M.	Spindle cell sarcoma of leg		4		5				1¾		
Paul C. Samson	Carcinoma of colon	6		6	1½		3½				
Univ. of Mich. Hosp., V.A.B.	Renal cell carcinoma	5	1	5	6¾		1				

The patients are listed chronologically, according to the dates of pulmonary resection.

Only the 5 cases of Barney and Churchill; Brezina and Lindskog; Deming and Lindskog; Raine; and Tinney and McDonald have been published elsewhere.

*This patient's first lobectomy was followed by the appearance of a second metastasis for which another lobectomy was performed. The two lines of figures refer to this circumstance.

†Multiple operations were performed for recurring carcinoma of the bladder and urethra during a period of 8 years and 9 months. As the particular lesion from which the pulmonary metastasis arose is not known, the metastasis might have occurred at any time during this long period.

Dr. Barney's and Dr. Churchill's patient, a woman of 55 years of age, was seen medically in October, 1931, when she had an old tuberculous lesion in the right apex and a discrete irregular nodule, 1 inch in diameter, in the left mid lung. In the absence of any lesion elsewhere, the pulmonary lesions were not considered important. Later the patient had hematuria, an enlarged kidney, and night sweats. Her physician considered the condition hopeless and advised sanatorium care.

Dr. Barney first saw the patient on April 14, 1932. There was a large, irregular, not tender mass in the left loin. The left-sided pulmonary nodule had increased in 5 months to a diameter of 2 centimeters. In the differential diagnosis, tuberculosis of the lung or pleura and kidney, and hypernephroma with metastasis to the lung were chiefly considered.

The kidney and its well encapsulated tumor were removed by Dr. Barney on April 18, 1932. Microscopically, the tumor was a well differentiated adenocarcinoma with a few mitotic figures.

X-ray therapy was given without benefit to the pulmonary nodule from April 28 to May 9, 1932. Between March, 1932, and July, 1933, the nodule

doubled in size. On July 18, 1933, Dr. Churchill resected two-fifths (the lingular portion) of the left upper lobe, including the tumor which measured 6 by 4 by 5 centimeters. There were no pleural adhesions although, in one place, the tumor extended to the visceral pleura. No pleural or lymphatic metastasis was seen. Microscopically, the tumor consisted of renal adenocarcinoma cells that were much larger and more atypical than those in the renal tumor.

The patient was last seen 12 years after the removal of the pulmonary metastasis, when she was 67 years of age. She was in perfect health and there was no demonstrable clinical or x-ray evidence of any other metastasis.

This is the earliest case of which we can find a record in which a metastatic lesion in the lung was successfully removed either before or after the removal of the primary malignant lesion.

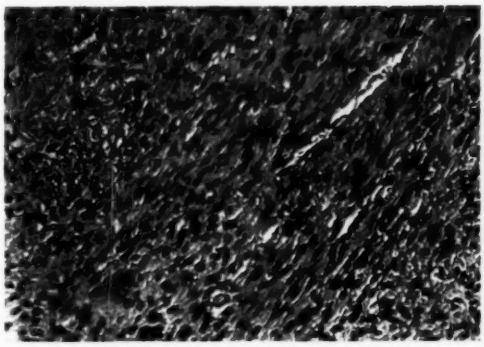

Fig. 1. Patient L. H. W. Section from the Cleveland Clinic. Spindle cell sarcoma of neurofibromatous origin (ulnar nerve). Highly cellular; tendency to form whorls; occasional division figures; infiltration of voluntary muscle. A large nerve trunk is present within the neoplasm.

Death 3 days after removal of left lower lobe and partial removal of left upper lobe, which was 9 years and 4 months after resection of the jaw for carcinoma.

Dr. Frank S. Dolley's patient, 54 years of age, had an extensive resection of the mandible for carcinoma in 1928. A nonproductive cough developed in January, 1937. Later, chest x-ray films showed a circular shadow extending from the left border of the heart and an indefinite density at the left first costal level. On April 30, 1937, Dr. Dolley removed the lower lobe, which contained a subpleural tumor 4.5 centimeters in diameter and also removed a wedge-shaped portion of the upper lobe which contained two subpleural nodules, the larger being 2 centimeters in diameter. The microscopic diagnosis was metastatic adamantinoma, probably derived from epidental epithelial structures. The patient developed an extensive bronchial pneumonia and died 3 days after operation. Permission for a postmortem examination could not be obtained.

Well 6 years after the second of bilateral lobectomies, which were performed 13 and 26 months, respectively, after removal of a neurogenic sarcoma of the forearm.

L.H.W., No. 446,282, a 22 year old woman, a schoolteacher, was first admitted to the University of Michigan Hospital on July 7, 1939. In September, 1937, a marble-sized nodule was noticed on the ulnar aspect of the left forearm a short distance below the elbow 2 weeks following a fall on this arm. The nodule was massaged for 9 weeks by a physician, during which time it increased in size, became tender, and

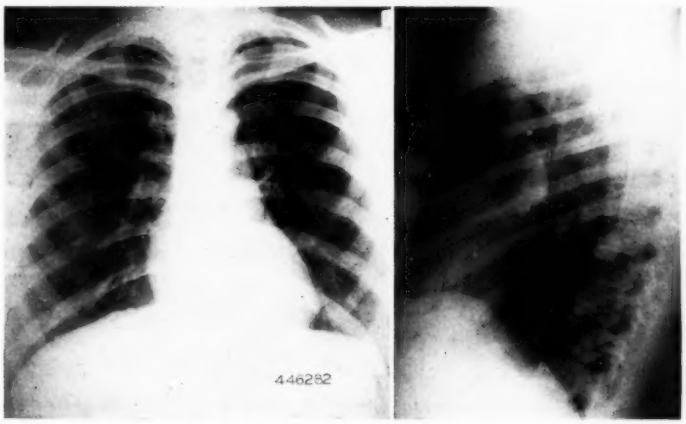

Fig. 2. Patient L. H. W. Roentgenograms of July 7, 1939. Round shadow in right lower lobe 1 year after sarcoma was removed from forearm. In a, left, the lesion is seen at the anterior end of the fourth rib and in b, overlying the spine (arrows).

Fig. 3. Patient L. H. W. Metastatic lesion in right lower lobe of lung of same type and degree of cellularity as lesion shown in Figure 1. Atelectatic lung surrounds the neoplasm.

numbness developed in the fourth and fifth fingers. In January, 1938, an orange-sized tumor was excised but in March, 1938, a still larger tumor appeared, causing pain in the arm and hand. Sarcoma was diagnosed from a slide and x-ray therapy was given, but without favorable effect.

In May, 1938, the patient went to The Johns Hopkins Hospital where Dr. Dean Lewis advised amputation and Dr. Walter Dandy advised wide excision. The next month she consulted Dr. Alexander T. Bunts of the Cleveland Clinic. She was then having intractable pain in the arm and hand Chest x-ray films showed no lesion. On June 7, 1938, Dr. Bunts widely excised the tumor, including the ulnar and median nerves, and muscle masses. Microscopically, the tumor was a spindle cell neurogenic sarcoma (Fig. 1).

A year later the patient returned to Dr. Bunts because of pain in the hand and forearm. She had gained 16 pounds in weight during the preceding year. Although there was no palpable evidence of local recurrence, Dr. Bunts reopened the incision on June 23, 1939, finding only a benign neuroma in the stump of the ulnar nerve: he injected the proximal ends of both the ulnar and median nerves with alcohol. Check-up chest x-ray films at this time showed a 2 centimeter circular nodule in the right lower lobe. Dr. Bunts referred the patient to us for consideration of lobectomy.

We first saw the patient on July 7, 1939. She had no cough, hemoptysis, dyspnea or pleural pain although she spoke of a mild aching in the right chest since learning of a lesion there a few days before. New x-ray films (Fig. 2) showed no change in the pulmonary lesion which, on the basis of probability, was considered to be a metastasis that had arisen from the forearm a year or longer previously, rather than tuberculosis, a benign neoplasm, or a primary bronchogenic carcinoma.

The patient was obese, weighing 145 pounds. Except for the defect in the upper left forearm and the atrophy of the muscles supplied by the ulnar and median nerves, a general physical and laboratory examination revealed no abnormality having any bearing on the present illness.

As only a single metastasis could be found 13 months after the primary neoplasm had been completely removed (as demonstrated by the exploratory operation on the forearm a year later), we agreed with Dr. Bunts that refusal to remove the metastatic lesion would be unjustifiable. On July 8, 1939, therefore, John Alexander removed the lower lobe of the

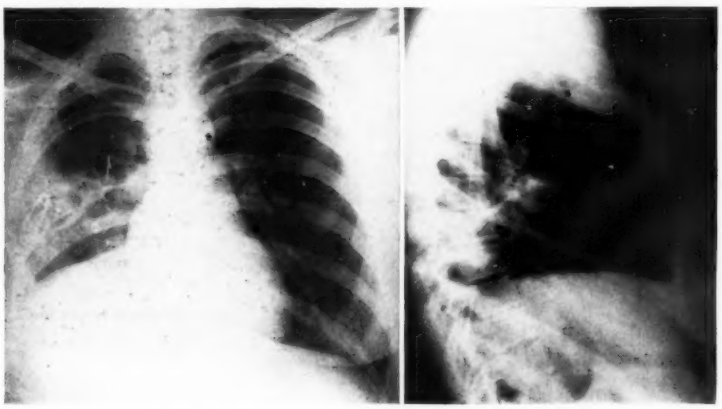

Fig. 4. Patient L. H. W. Roentgenograms of February 14, 1940, 20 months after removal of sarcoma from forearm and 8 months after removal of right lower pulmonary lobe. Sharply marginated shadow (arrows) appears at left of, and behind, uppermost sternum. Roentgenogram at left shows elevated right diaphragm and rib defects resulting from lobectomy and empyema.

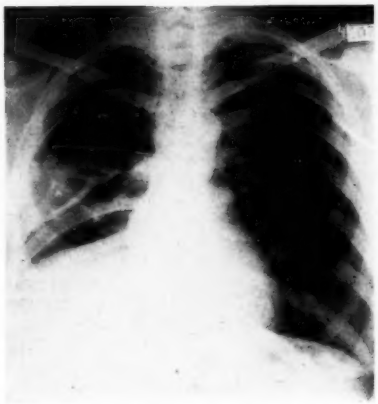

Fig. 5. Patient L. H. W. X-ray film of June 17, 1940. Great increase in size of left-sided lesion in 4 months (compare with Fig. 4).

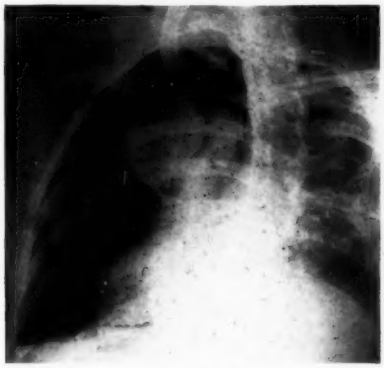

Fig. 6. Patient L. H. W. Right anterior oblique roentgenogram of July 25, 1940. Diagnostic pneumothorax shows that the left-sided tumor is in the lung, not in the mediastinum.

right lung. There were no pleural adhesions or fluid; the nodule was palpable deep in the lower lobe at the junction between its upper and middle thirds; there were no palpably enlarged hilar or mediastinal lymph nodes. Dr. R. C. Wanstrom of the Department of Pathology reported that the nodule, measuring 2.5 by 2 by 2 centimeters, was firm and well encapsulated. It was a spindle-cell neurogenic sarcoma (Fig. 3) of the same type and degree of cellularity as that removed from the forearm.

This 1939 lobectomy, which was among the last in this clinic performed by the tourniquet technique, was complicated by a shallow, basal empyema with an intermittently open bronchopleural fistula. This condition was unusually troublesome, because of pocketing in the broad shallow empyema space, and was accompanied from time to time by fever and attacks of coughing and expectoration from the bronchial fistula. Several minor operations in the back and axilla were carried out before the empyema became obliterated and sputum ceased in May, 1942.

Check-up chest x-ray films on February 14, 1940 (Fig. 4) showed a homogeneous opacity with a well-defined lateral border projecting from the left lateral border of the sternum above the aortic arch; in the lateral projection the mass lay immediately posterior to the plane of the sternum. This lesion had not been visible in the December, 1939, roentgenograms. The patient was advised to have x-ray therapy at home in Pittsburgh, which she did not have. She returned on June 17, 1940, when the lesion had increased more than twice in size (Fig. 5) since February. No other neoplastic lesion was visible.

The patient had gained 25 pounds during the preceding 6 months. A thorough physical examination revealed no other metastasis than that in the left lung and there was no sign of recurrence of the primary lesion in the forearm. As the absence of pleural adhesions and the use of a tourniquet had permitted removal of the right lower lobe with almost no manipulation of the sarcoma deep within the lobe, the chance of this small lesion's having been the source of the metastasis to the left upper lobe seemed small. More likely was the chance that the metastases to both lungs had their source in the primary sarcoma before it had been completely removed 2 years previously. If this hypothesis were true, only two metastatic lesions had become demonstrable in 2 years and there was at least a possibility that no others would appear. Small though this chance was, removal of the left upper lobe was recommended provided that a preliminary pneumothorax showed that the lesion was in the lung (which was found to be the

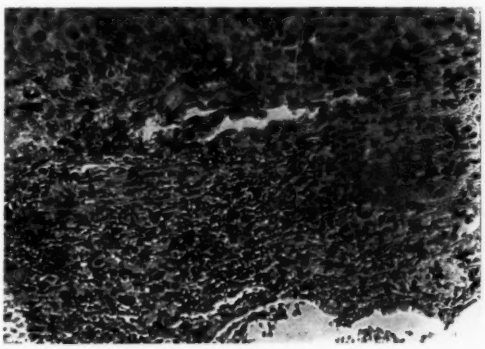

Fig. 7. Patient L. H. W. Metastatic spindle-cell sarcoma of left upper pulmonary lobe. More cellular and less well differentiated than the primary neoplasm or right pulmonary metastasis (compare with Figs. 1 and 3). Numerous cell division figures and hyperchromatic nuclei. In some areas the cells are losing their spindle form and are becoming large and round or oval. Extensive hemorrhage and necrosis.

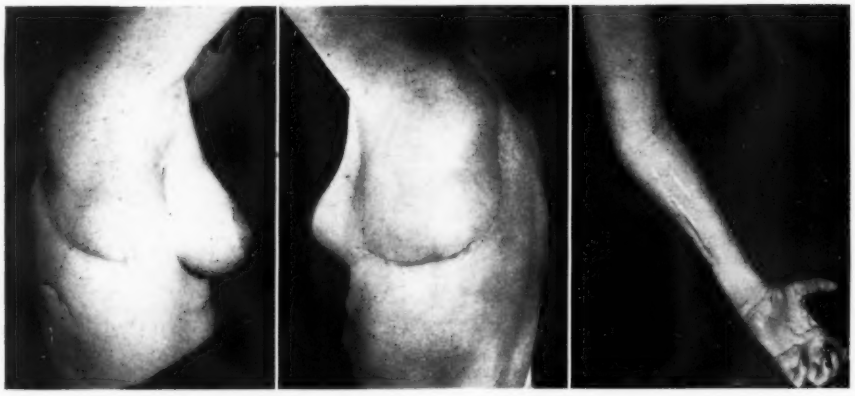

Fig. 8. Patient L. H. W. on July 30, 1945.

case (Fig. 6)) and not in the mediastinum. As the patient had been told elsewhere the nature of her trouble, the situation with regard to operation was explained to her. She promptly chose operation, small though she knew the chance of cure to be.

The patient was readmitted to the hospital on July 24, 1940. The pneumothorax referred to in the last paragraph was induced and on July 26, 1940, John Alexander removed the left upper lobe which, except for its lingular and inferior axillary segments, was almost entirely replaced by necrotic neoplasm. The only pleural adhesions were attached to the mediastinum above the pulmonary hilum, and to the mesial first intercostal space and second costal cartilage. Many of these adhesions were found to be very vascular when divided. Division of the lower mediastinal adhesions, which apparently walled off an impending perforation of the cortex of the lung, caused some of the semifluid necrotic contents of the neoplasm to spill into the pleural cavity, which was thoroughly lavaged after the lobe had been removed. Those portions of the mediastinal and anterior parietal pleura that appeared as if they might contain sarcoma tissue were excised into grossly normal tissue and the mesial portion of the first internal intercostal muscle and what appeared to be the atrophic left lobe of the thymus gland were also removed. Microscopic examination of these tissues by Dr. R. C. Wanstrom showed no evidence of neoplasm. In the pleura were fibroblastic proliferation and organizing hemorrhage, and in the "thymus" highly necrotic adipose tissue, occasional lymphocytic infiltration around vessels, and localized fibroblastic proliferation; in the intercostal muscle specimen were a group of cells suggesting a lymph node that had lost its follicular architecture. The pulmonary lobe and its necrotic hemorrhagic contents showed a spindle cell sarcoma that was more cellular and less well differentiated than the primary and right lower lobe neoplasms (Fig. 7).

During the 4 years following this operation the patient did very well except that the fear of recurrence caused an anxiety psychoneurosis that was manifested by such occasionally occurring subjective symptoms as aching in the throat, oppression at the suprasternal notch, blurring of vision and pain behind the eyes, a sensation of tightness in the throat and upper abdomen, an urge to gasp, undue dyspnea and a sensation of pressure around the forehead Thorough physical examinations failed to reveal organic lesions as responsible for the symptoms. Knowledge of these findings and reassurance usually resulted in disappearance of the symptoms in a short time.

The last check-up examination was made on October 17, 1946, which was 6 years after the second lobectomy, 7 years after the first lobectomy and 8 years after the removal of the primary sarcoma. There was no evidence of recurrence. The patient was in excellent health and, during the preceding 2 years, she had worried little about recurrence and had been virtually free of the symptoms of anxiety psychoneurosis.

Well 7 years after pneumonectomy, which was 4 years after removal of a breast sarcoma.

Dr. Richard H. Sweet's patient No. 1, a woman, had a radical mastectomy performed by Dr. Daniel Fiske Jones and Dr. Sweet on January 11, 1935, for an immense sarcoma. The patient was well for 4 years and then developed a troublesome cough. X-ray examination showed a large round shadow in the right lower lung. No other evidence of primary or secondary neoplasm could be found. On November 3, 1939, Dr. Sweet removed the right lung. A tumor of the lower lobe had invaded by direct extension the adjacent surfaces of the middle and lower lobes. Microscopically, the tumor was seen to have been metastatic from the breast sarcoma. The patient has been carefully followed to October 25, 1946 (7 years

after pneumonectomy) and has had no sign of recurrence or other metastases.

Recurrence 3 months after pneumonectomy, which was 22 months after removal of a sigmoid carcinoma.

Dr. Forrester Raine's patient was a woman of 59 years of age who had had a carcinoma of the sigmoid removed in January, 1939. In October, 1939, coughing began and increased until she was admitted to the Milwaukee County Hospital on August 27, 1940. She then had a severe hemoptysis, fever, night sweats, and had lost 40 pounds in weight between October, 1939, and September, 1940.

X-ray examination of the chest showed a shadow in the region of the right middle and lower lobes but no nodules elsewhere. There was no sign of recurrence of the sigmoid carcinoma. The liver was not enlarged and there was no palpable enlargement of lymph nodes. Bronchoscopy showed a large papillary mass in the right main bronchus just below the upper lobe bronchus; a biopsy specimen revealed adenocarcinoma typical of carcinoma of the colon.

A pneumonectomy was performed on October 14, 1940. In addition to the principal tumor mass, a separate nodule was found near the base of the lower lobe. Early in January, 1941, the patient developed gastric distress and "presumably had metastasis near the liver."

Well 5 years after pneumonectomy, which was 3 years after nephrectomy for carcinoma.

Dr. W. S. Tinney's and Dr. J. R. McDonald's patient, a woman 39 years of age, had a right nephrectomy for a renal cell carcinoma in July, 1938, after 9 months of hematuria. A neoplastic thrombus was found in the renal vein. The patient was well until July, 1940, when she had chest pain, nocturnal dyspnea, cough and hemoptysis. Bronchoscopy showed a tumor in the left upper lobe bronchus, a biopsy of which revealed a renal cell carcinoma.

The left lung, containing a 5.5 by 4 by 3.5 centimeter tumor mass surrounding the major vessels and bronchi, was removed by Dr. Stuart W. Harrington on August 20, 1941 (sic). The tumor consisted of a metastatic grade 1 papillary renal cell carcinoma; the peribronchial lymph nodes contained carcinoma cells. The patient was last seen on June 8, 1946, and was heard from on July 19, 1946; she was in excellent general condition, weighing 183 pounds and had no complaints except slight hemoptysis and an occasional cough. A bronchoscopic examination on June 5, 1945, showed that the stump of the left main bronchus was in good condition; some inflammatory reaction and a small amount of blood were found in the right lower lobe bronchus; bronchiectasis was considered but not proved.

Well 4 years after lobectomy, which was 21 months after removal of a sarcoma of the thigh.

A.B., No. 473,121, a surgeon, 50 years of age, was first seen at the University of Michigan Hospital by Dr. Frederick A. Coller on December 30, 1940.

Fig. 9. Patient L. H. W. Last check-up x-ray film of October 17, 1946. No evidence of recurrence 6 years after removal of second pulmonary metastasis, 7 years after removal of first pulmonary metastasis and 8 years after removal of primary neurogenic sarcoma of forearm.

Three weeks previously the patient had noticed an increase in the size of his lower right thigh. An initial "peculiar sensation" was succeeded by a dull ache. He had no recollection of trauma of the thigh. His father had died of carcinoma of the rectosigmoid at the age of 93 years and his maternal grandmother had died of carcinoma of the uterus. Otherwise, the family's and the patient's own medical histories are not relevant to the present illness.

In general appearance, the patient seemed to be well. His weight of 150 pounds was his usual weight. The blood pressure was 122/76, the hemoglobin 100 per cent, the white blood cells 10,300, the urine normal and the blood Kahn reaction negative. On the lateral aspect of the right thigh, extending from 10 to 20 centimeters cephalad to the patellar level, there was a mass measuring approximately 10 by 5 centimeters, moderately fixed in the muscle, firm and not fluctuant, and not reddened or tender. X-ray films of the femur, lumbar spine, pelvis and chest, and the general physical examination revealed no evidence of significant abnormality.

The thigh tumor, which appeared to arise in the epimysium of the vastus lateralis and which was not attached to the femur, was removed with an adequate margin of surrounding tissue by Dr. Coller on December 31, 1940. The Department of Pathology reported (this and all the subsequent pathology reports about this patient were made by Dr. C. V. Weller or Dr. R. C. Wanstrom) that the specimen weighed 168 grams and measured 10 by 6 by 6 centimeters. Microscopically, the tumor was a spindle-cell fibrosarcoma with many bizarre hyperchromatic nuclei; the voluntary muscle was infiltrated (Fig. 10).

On July 22, 1941, a nodule in the skin scar, which was believed to be an implantation metastasis, was

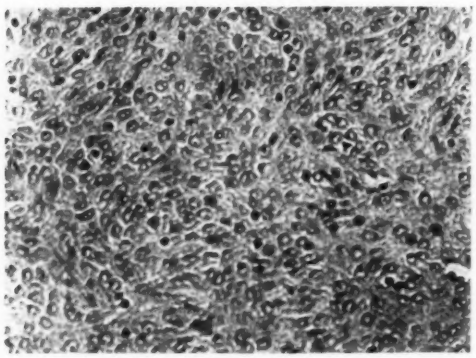

Fig. 10. Patient A. B. Spindle-cell fibrosarcoma from lower thigh. Many bizarre hyperchromatic nuclei; areas of necrosis; infiltration into voluntary muscle.

excised. It showed adipose and connective tissue infiltrated with spindle-cell sarcoma having many hyperchromatic nuclei.

Without Dr. Coller's approval the patient was given x-ray therapy of the former tumor area at another hospital between July 30 and August 15, 1941.

Chest x-ray films of June 24, 1941, and lumbar spine and pelvis roentgenograms of August 4, 1942, showed no significant abnormalities. The chest roentgenograms of August 4, 1942, however, showed a small, smoothly rounded shadow at the lower border of the anterior first right rib which had not been visible in any previous x-ray film. Four other chest roentgenograms taken between August 4 and September 22 showed no change in the size or shape of the lesion, and no other lesion could be seen. Although tuberculosis and other conditions were considered as possibilities in the differential diagnosis, metastatic sarcoma seemed most probable and the case was, therefore, managed on this assumption.

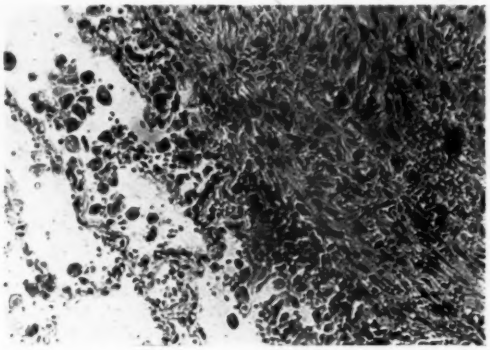

Fig. 12. Patient A. B. Metastatic spindle cell sarcoma of right upper pulmonary lobe exactly like that of thigh (Fig. 10). The lesion appears to be growing slowly.

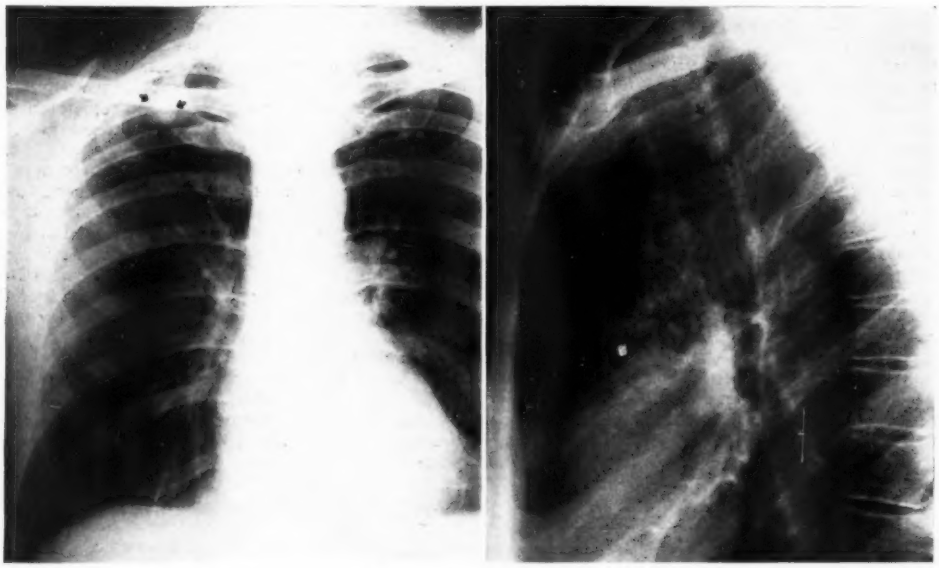

Fig. 11. Patient A. B. Roentgenograms of September 22, 1945, 21 months after sarcoma was removed from thigh. Circular metastatic lesion is indicated by arrows.

Fig. 13. Patient A. B. Photographs of July 13, 1945. At left, the lobectomy incision is faintly visible. At right, area of excision of sarcoma of thigh and subsequent x-ray dermatitis has been skin grafted. Small ulcers on femur are not malignant.

Fig. 14. Patient A. B. X-ray film of October 16, 1946, 4 years after lobectomy and 5 years and 8 months after removal of thigh sarcoma. No evidence of recurrence. The costophrenic angles are obliterated,—the right as a result of the lobectomy and the left as a result of an old pleuritis.

We first saw the patient on September 3, 1942. He was understandably very apprehensive and had doubled his cigarette smoking from one to two packages a day, which was followed by an increase in his "cigarette cough" and yellowish-white sputum. Otherwise he had no symptoms and no thoracic pain. Physical examination revealed no important abnormality and there was no evidence of metastasis except the single supposed one in the right lung. The cervical, axillary, and inguinal lymph nodes were not enlarged. The thigh incision was healed except for two small necrotic areas in stitch scars. The region was firm, indurated and not tender; there was considerable roentgen dermatitis.

As nearly 21 months had passed since the removal of the primary sarcoma (13 months since the nodule in the skin incision had been removed) and as there was no evidence of any metastasis except the single one in the right lung, its removal seemed almost mandatory, provided that no recurrence had taken place in the thigh. On September 5, therefore, Dr. Coller removed 3 large slices from the indurated region of the thigh that had contained the primary sarcoma and that had become greatly fibrosed following x-ray therapy. Microscopic examination of 27 sections of this material revealed no evidence of recurrence.

On September 23, 1942, John Alexander removed the upper lobe of the right lung. The small nodule was immediately beneath the visceral pleura in the anterior part of the lung 3 centimeters inferior to the apex. There were no overlying pleural adhesions. A few tiny anthracotic lymph nodes were present among the hilar structures. A 9 by 3 centimeter portion of the upper lobe was congenitally fused with the apical portion of the lower lobe, requiring sharp division.

Gross examination of the lobe and microscopic examination of 7 large blocks of tissue showed only a single neoplastic nodule. This measured 3 by 8 by 12 millimeters. It was a spindle cell sarcoma (Fig. 12) exactly like that found in the thigh. Its center was necrotic and it appeared to have been growing only slowly.

The patient had an uneventful convalescence and was discharged from the hospital on October 9, 1942.

In January, 1943, a wide excision was made by Dr. Coller of the roentgen dermatitis area of skin and its contained ulcers and of the underlying fibrosed tissues. Microscopically, no neoplasm was found. In February, 1943, Dr. Henry Ramson covered the denuded area with a split thickness graft, 90 per cent of which lived.

The patient was last examined on October 16, 1946, 4 years after the lobectomy and 5 years and 8 months after the sarcoma of the thigh had been removed. He has no symptom or physical or roentgenographic (Fig. 14) sign of recurrence of the sarcoma; flexion of the right knee is limited to 10 degrees because of a "catching" of the quadriceps tendon. He operates for approximately 5 hours on each of 5 days a week.

Recurrence (subsequent death) 1 year after lobectomy, which was 10 years after removal of a carcinoma of the ovary.

Dr. Richard H. Sweet's patient No. 2, a woman, was found by x-ray examination to have an irregular shadow in the right upper lung field which was diagnosed as bronchogenic carcinoma, although a bronchoscopic examination showed no lesion. Dr. Sweet removed the right upper lobe on January 26, 1943. Microscopic examination of the tumor indicated that it was not primary in the lung. Further inquiry into the patient's history revealed that an oophorectomy had been performed for a cyst 10 years previously at another hospital. Microscopic comparison of the tumors of the ovary and lung showed that both were carcinomas of identical type. About 1 year after the lobectomy, recurrence was found in the chest, although not in the pelvis, and the patient subsequently died.

Death 2 years after pneumonectomy, which was 13 years after hysterectomy for carcinoma.

Dr. P. S. Brezina's and Dr. G. E. Lindskog's patient was a woman of 65 years of age when she was admitted to the New Haven Hospital on April 5, 1943, complaining of cough of 6 months' duration and blood streaked sputum of 5 months' duration. Thirteen years previously she had had at another hospital a subtotal hysterectomy and bilateral salpingo-oophorectomy; carcinoma was diagnosed by gross inspection of the lesion but a microscopic examination was not made.

April, 1943, x-ray films showed a 9 centimeter mass in the right lung at the hilar level. Bronchoscopy revealed puckering of the right main and upper lobe bronchi but a biopsy specimen did not show carcinoma. A pneumonectomy was performed on April 17, 1943. There were no pleural adhesions and no enlargement or microscopic involvement of the mediastinal lymph nodes. The necrotic tumor, which was in the upper lobe and had a very thin capsule, was composed of columnar-cell glands. The pathological diagnosis was metastasis from adenocarcinoma of the uterus.

When the patient was last examined on September 20, 1943, 5½ months after the pneumonectomy, she was in good general condition and without evidence of recurrence in the pelvis, lung, or elsewhere. The patient died at home or in another hospital with carcinoma in the liver on April 2, 1945, 2 years after the pneumonectomy.

Well 3 years after pneumonectomy, which was 4½ years after resection of a rectal carcinoma.

Dr. Alfred Blalock's patient, a man 54 years of age, was admitted to The Johns Hopkins Hospital on September 19, 1943. In March, 1939, a rectal carcinoma had been removed and in the following July the sigmoid was anastamosed to the remains of the rectum.

In October, 1942, the patient developed a cough and a cold which persisted for a month. Increasingly severe colds recurred for 7 months. During the following 3 months he had a persisting cough, low-grade fever and loss of energy but no hemoptysis. Chest roentgenograms made during this 3 month period were at first interpreted as showing only pulmonary infection of the right lower lung and later as an enlarging neoplasm.

Otherwise the past medical history and the family history are not relevant to the illness under consideration. On physical examination the right pulmonary base was dull to percussion and it descended fairly well during inspiration; breath sounds were normal. Examination of the abdomen, rectum, genitalia, and extremities revealed nothing of importance. On September 22, 1943, Dr. Blalock removed the right lung, believing that the tumor mass was either a solitary metastasis from the rectal carcinoma or a primary bronchogenic carcinoma. Microscopically, it proved to be an adenocarcinoma, presumably metastatic from the rectum.

When last seen in October, 1946, 3 years and 1 month after the pneumonectomy, there was no sign of recurrence. During the preceding 11 months the patient had had recurrent attacks of epididymitis, head and chest colds, and one attack of pneumonia, from which he made a rapid recovery.

Death 10 months after pneumonectomy, which was 4 years and 10 months after a thigh amputation for sarcoma.

Dr. Duane Carr's patient, a man of 26 years of age, had had a left thigh amputation for osteogenic sarcoma in January, 1939. A routine chest roentgenogram in February, 1943, showed a 2 inch, round, sharply defined mass of homogeneous density opposite the right pulmonary hilum. At this time there were no symptoms but in July, 1943, a morning cough developed and a 2 ounce hemoptysis occurred and was followed by small hemoptyses or blood-streaked sputum almost every day.

Dr. Carr first saw the patient on November 3, 1943. A thorough physical examination disclosed no evidence of any tumor except that in the right lung. Roentgenograms of all the long bones, the pelvis, spine, and skull showed nothing suggestive of neoplasm. On November 9, 1943, Dr. Carr removed the right lung. The tumor was round, hard, apparently encapsulated, and had a diameter of 8.5 centimeters. The mesial border of the tumor was engaged in the hilum. The pathological report stated that the tumor, which was an anaplastic fibrosarcoma, contained areas of necrosis and appeared to have perforated the mesial aspect of the capsule in several places.

The patient was doing part-time office work in March, 1944. Late in April a small nodule appeared on his temple, enlarged and was removed by another surgeon. The patient developed a transverse myelitis and x-ray films of July 21, 1944, showed destruction of the seventh and eighth thoracic vertebrae. The patient died about September 1, 1944.

Death 5½ months after pneumonectomy, which was from 15 months to 8½ years after various resections of carcinomatous papillomas of bladder and urethra.

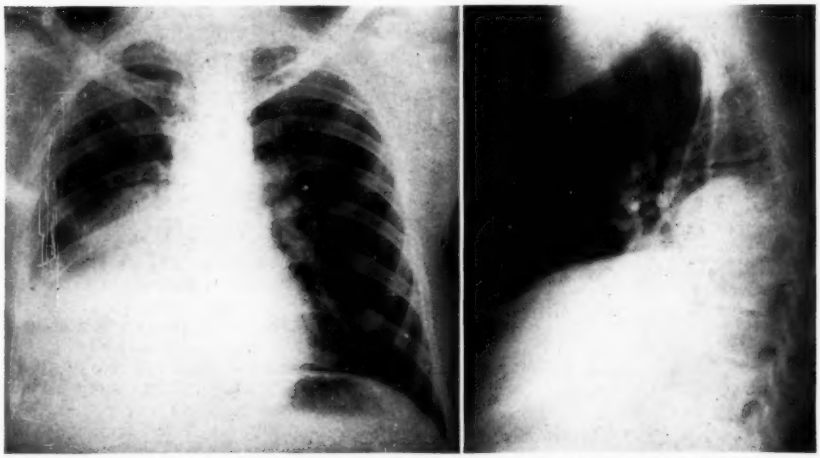

Fig. 15. Patient R. L. L. Roentgenograms of August 25, 1945 showing tumor in right lower lung posteriorly.

Dr. C. L. Deming's and Dr. G. E. Lindskog's patient, a man 54 years of age, was first known to have bladder papillomas in 1931. In 1935, a biopsy showed probable malignancy and a later biopsy showed definite malignancy; cauterization was carried out. Other papillomas were removed from the bladder and urethra during the next 2 or 3 years. Radium was used. The membranous and anterior urethra was excised on January 10, 1941, because of stricture and papillomas. Other papillomas were removed and in September, 1942, the end of the penis was amputated because of an infiltrating papilloma of the meatal mucosa.

Beginning in June, 1943, cough, chest oppression and pain developed. Roentgenograms showed a pulmonary tumor but no evidence of metastasis to bones. The bladder and posterior urethra showed no recurrence of papilloma. The right lung was removed on December 7, 1943. Microscopically, the tumor of the upper lobe had a cellular arrangement similar to that of the tumors of the bladder and urethra. In February, 1944, there was evidence of metastasis to the right iliac crest and the patient died on May 22, 1944.

Death 2 years after pulmonary lobectomy, which was 15 months after orchidectomy for a teratoma.

Dr. Stuart W. Harrington's patient was a man who had had a left orchidectomy for a teratoma in another clinic in March, 1943. A solitary pulmonary metastasis was first noted by x-ray in February, 1944; there were then no pulmonary symptoms. The tumor failed to respond to intensive x-ray therapy and increased in size.

The patient was in very good general condition when seen by Dr. Harrington, who removed the lower lobe of the right lung on June 10, 1944. The tumor was a fairly well delimited metastatic teratoma, 4 by 2.5 by 2.5 centimeters in size, and contained a few areas of grade 2 adenocarcinoma.

The patient appeared well until 1½ years later, when x-ray examination showed a mediastinal mass which gradually increased in size in spite of x-ray therapy. Death occurred 2 years after lobectomy.

Well 9 months after lobectomy, which was 26 months after resection of a thoracic wall sarcoma.

Dr. Richard H. Sweet's patient No. 3, a man in his middle fifties, had a fibrosarcoma excised from his thoracic wall on December 4, 1942. More than 2 years later a very small, lobulated shadow appeared by x-ray in his left lower lobe, which was removed on January 31, 1945, on the assumption that the lesion was probably a single metastasis. Microscopically, the pulmonary lesion was shown to be a fibrosarcoma. Nine months later the patient was apparently well. He failed to report for examination during the following year.

Well 15 months after lobectomy, which was 3 weeks after nephrectomy for carcinoma.

Dr. Richard H. Sweet's patient No. 4, a man, had had an abdominal nephrectomy for a renal cell carcinoma. Three weeks later, in March, 1945, Dr. Sweet removed the left upper pulmonary lobe for a solitary metastasis. When last seen in June, 1946, 15 months after the lobectomy, the patient was apparently well.

Probable cerebral metastasis 6 weeks after lobectomy, which was 2 months after nephrectomy for carcinoma; subsequent death.

Dr. Richard H. Sweet's patient No. 5, a man, had a right nephrectomy early in June, 1945, for a renal

Fig. 16. Patient H. A. B. X-ray film of January 15, 1946, showing large tumor with clearly defined and lobulated margins.

cell carcinoma. A small rounded shadow was discovered in the left upper pulmonary lobe, which Dr. Sweet removed on July 30, 1945. Approximately 6 weeks later the patient had a hemiplegia which his home physician assumed was due to a cerebral metastasis or, possibly, a cerebral embolus.

Well 13 months after double lobectomy, which was 2 years and 5 months after amputation for a sarcoma of the thigh.

R.L.L. No. 470,334, 29 year old man, a groundskeeper, noticed a small tumor above his left knee 4 months following a kick by a horse in 1934. The tumor was removed and found to be a fibrosarcoma. In 1938, a recurrent tumor was excised and recurred again. When first seen at the University Hospital in October, 1940, it was fixed in the deep tissues above and mesial to the knee and measured 4 by 3 by 3 cen timeters. This tumor was removed at another hospital.

The patient was readmitted on February 17, 1943, 4 days after he noticed a 4 centimeter tumor mass fixed in the left popliteal space. This tumor, which lay between the popliteal artery and the femur, was removed on February 25, 1943, by Dr. John Lawther. Microscopic examination was reported by Dr. C. V. Weller as showing a necrotic spindle-cell fibrosarcoma with many hyperchromatic nuclei and in some areas it was highly cellular,—more cellular than it was in 1940. The neoplasm was found to extend beyond the area of excision. Apart from this finding, the Tumor Conference had recommended, before this operation was performed, that amputation be carried out if the sarcoma were found to have increased in cellularity. A high thigh amputation was performed on March 25, 1943, by Dr. Lawther. Microscopically no neoplasm could be found from the examination of many sections.

The patient remained well and worked until April, 1945, except for traumatic fractures of his hand shortly before this. In April he developed an irritative cough with mucopurulent sputum. For a few days late in July these symptoms increased and a temperature of 104 degrees dropped rapidly with penicillin and sulfonamide therapy. On August 24, 1945, he was readmitted to the University Hospital. Physical examination indicated an extensive infiltration in the right lower posterior hemithorax. X-ray films showed a large intrathoracic mass with smoothly rounded superior and anterior borders, suggesting a metastatic lesion (Fig. 15). No other lesion could be seen in either lung. Chest x-ray films of October 29, 1940, and February 17, 1943, had showed no abnormality. Films received from another hospital showed a right-sided lesion on April 30, 1945.

Physical examination revealed no other metastasis than the single one in the right lung. No pleural fluid was recovered by needle aspiration of the right lower chest. Bronchoscopy by Cameron Haight on August 27, 1945, showed a tumor mass occluding the right intermediate bronchus but not involving the upper lobe bronchus. Microscopically, a biopsy of this tumor revealed spindle-cell fibrosarcoma infiltrating beneath the respiratory epithelium (this and the subsequent pathology report were made by Dr. R. C. Wanstrom).

On September 4, 1945, Cameron Haight removed the right lower and middle pulmonary lobes together with most of the intermediate bronchus into which a pedunculated portion of the tumor had extended but to the wall of which it was not attached. The tumor, measuring 9 by 6.5 centimeters occupied the upper portion of the lower lobe. The lower and middle lobes were atelectatic. The entire pleural cavity was obliterated by adhesions. No enlarged lymph nodes were palpable in the hilum or mediastinum. Microscopically, the intermediate bronchus showed no neoplasm. The lung showed infiltration by spindle-cell sarcoma and the consequences of bronchial obstruction, i.e., bronchiectasis, chronic purulent fibroid pneumonia and organizing fibrinous pleuritis.

The patient was last seen as an out-patient on October 9, 1946, 13 months after the double lobectomy and 3½ years after the thigh amputation. He resumed his work as groundskeeper 5 weeks after the double lobectomy but did no heavy lifting for another 6 months. He has felt perfectly well, has gained 32 pounds, and has had no cough, cold, or any illness. Chest x-ray films show no evidence of neoplasm.

Possible cerebral metastasis 8 months after lobectomy, which was 4 years after resection of a rectal carcinoma.

Dr. O. T. Claggett's patient No. 1, a man 50 years of age, had an ulcerating grade 2 carcinoma of the mid and lower rectum removed in July, 1941. In

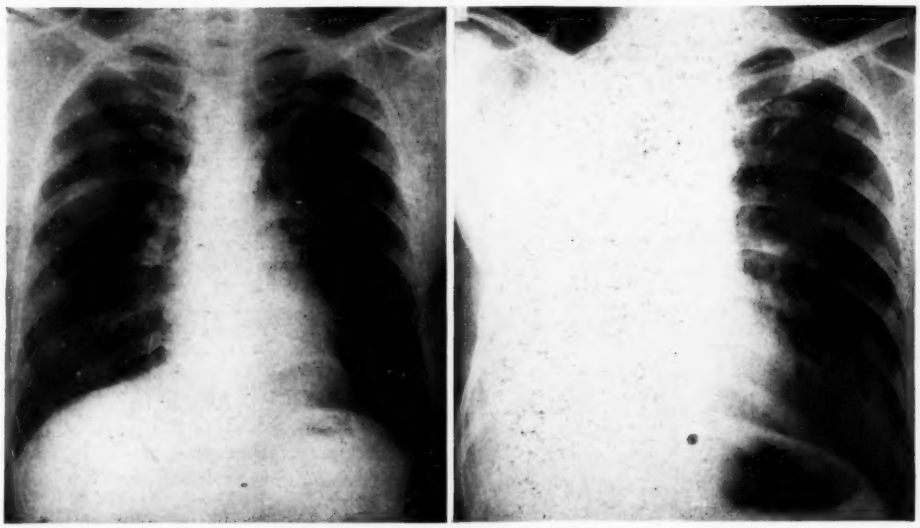

Fig. 17. Patient I. L. M. Left, roentgenogram of March 18, 1946, showing two tumors in right lung, the smaller one underlying the fifth costal cartilage. Right, x-ray film of June 27, 1946, showing metastasis in left lung after right pneumonectomy.

November, 1945, he was found to have a tumor in the right chest which had not been present on roentgenologic examination 1 year previously. Bronchoscopy showed no bronchial lesion. A solitary metastasis in the lung was suspected. A right upper lobectomy was carried out by Dr. Clagett on November 29, 1945. The lesion, which was 4 by 3.5 by 2 centimeters in size, proved to be an adenocarcinoma, grade 2. In July, 1946, the patient was found to have the symptoms and signs of a possible cerebral metastasis.

Recurrence 9 months after partial lobectomy, which was 2 years after nephrectomy for carcinoma.

Dr. Richard H. Sweet's patient No. 6, had a nephrectomy for a renal cell carcinoma. Two years later his physician, who had made frequent x-ray examinations because of the possibility of discovering an early, solitary, symptomless pulmonary metastasis, found a small nodule in the right lower lobe. In December, 1945, Dr. Sweet removed the small nodule, together with a margin of adjacent pulmonary tissue by means of a segmental partial lobectomy. Nine months later a check-up x-ray examination revealed numerous small round shadows throughout both lungs, which were interpreted as multiple metastases, although the patient appeared to be reasonably well.

Death 5 months after pneumonectomy, which was 6 years after resection of a rectal carcinoma.

H.A.B., No. 386,405, 49 years of age, a toolmaker, was admitted to the University Hospital on January 14, 1946. Six years previously Dr. F. A. Coller had removed a rectal carcinoma by combined abdominal and perineal resection at another hospital. The patient was perfectly well until January, 1944, when he developed a cough productive of 1 or 2 teaspoonsful of grayish sputum daily. During the year before admission he felt fatigued and 2 months before admission had a 15 cubic centimeter hemoptysis and developed a dull pain in his left shoulder extending to the elbow and the base of the neck. An occasional wheeze disappeared after expectoration. There had been no loss of weight.

The past medical and family histories were not significant. Physical examination, including that of the lungs, revealed no abnormality of importance. Chest roentgenograms (Fig. 16) showed a large mass with clearly defined and lobulated margins in the left lower lung; no other lesion was seen in either lung and the hila were not enlarged. The thoracic cage and spine showed no abnormality.

The patient was bronchoscoped by Cameron Haight on January 14, 1946. A lesion suggesting a primary bronchogenic carcinoma was obstructing the lingular bronchus; a biopsy specimen showed adenocarcinoma. On January 17, 1946, Cameron Haight removed the left lung. The lesion, approximately 8 centimeters in diameter, occupied the lingular and axillary segments of the upper lobe and the anterior segment of the lower lobe. The lesion was firmly adherent to a 6 by 8 centimeter area of the pericardium but there was no gross evidence of pericardial invasion. The tumor in the lung contained large areas of necrosis. Dr. W. A. Stryker of the Depart-

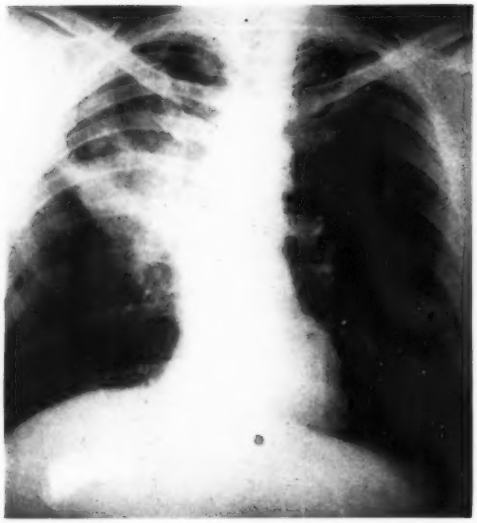

Fig. 18. Patient V. A. B. X-ray film of October 3, 1946, showing triangular shadow and 2 small nodules in right lung.

ment of Pathology reported an adenocarcinoma mucosum, suggesting metastasis from the rectal carcinoma. The cancerous infiltration extended into the adventitia of a number of blood vessels. One mediastinal lymph node contained carcinoma cells and two others did not.

The patient was discharged on February 1, but returned frequently as an out-patient, and for 2 weeks in April as an in-patient, complaining of dyspnea and pain in both the right and left sides of the chest. Spine x-ray films showed no lesion. The mediastinum was displaced only slightly toward the left. On April 20, 1,000 cubic centimeters, and on April 23, 1,300 cubic centimeters, of slightly cloudy fluid were aspirated from the right pleural cavity with great relief of dyspnea. No carcinoma cells could be found in either specimen. The dyspnea recurred on April 25 but no more fluid could be seen by fluoroscopy or recovered by needle. Although no metastatic lesion could be seen in the April x-ray films the occurrence of the right-sided pleural fluid, dyspnea, and right-sided thoracic pain made the presence of metastasis reasonably certain. The patient died in June, 1946. There was no autopsy.

Well 3 weeks after lobectomy, which was 4 years after amputation for a sarcoma of the os calcis.

Dr. O. T. Clagett's patient No. 2, a man 33 years of age, had an amputation for a grade 1 chondrosarcoma of the right os calcis in October, 1941. He returned to the Mayo Clinic in January, 1946, with a lesion in his right chest, which was suspected of being a metastasis. Dr. Clagett removed the right upper pulmonary lobe on February 19, 1946. The lesion was found to be a grade 1 osteogenic sarcoma and measured 12 by 8 by 5 centimeters. The patient was discharged on March 12, 1946.

Recurrence 7 weeks after pneumonectomy, which was 5 months after removal of a sarcoma of the leg.

I.L.M., No. 586,608, a 49 year old Philippino man, a student, was first admitted to the University Hospital on March 15, 1946. In March or April, 1944, a corn grain sized movable nodule was removed from the tissues over the head of the left fibula. The tumor recurred and in October, 1944, it was 3 centimeters in diameter and was removed. In July, 1945, it recurred, grew rapidly and was partly removed. An aspiration biopsy was carried out in September, showing sarcoma. In October, 1945, the lesion was apparently completely excised. Neither fluoroscopy of the chest in November nor chest x-ray films at the Chicago Tumor Institute and at the University of Michigan Health Service in January, 1946, revealed any abnormality. Roentgenograms of February 28, 1946, showed two small rounded nodules in the right mid and lower lung fields; the left lung and the hila were clear. By March 18 the lesions had definitely increased in size.

At the time of his admission he said that for a few months he had had a dry cough, the occasional expectoration of mucus, increasing dyspnea and, recently, some bloody expectoration. Since April, 1945, he had had malaria and measles. He had been severely malnourished during the Japanese occupation of his homeland. His weight on March 15 was 108 pounds; his best weight was 126 pounds.

The patient did not appear ill. His temperature was normal and his blood pressure 108/70. There were no abnormal physical signs from the lungs (Fig. 17). The cervical, axillary and inguinal lymph nodes were not enlarged. No mass or enlarged organ was palpable in the abdomen. There was no palpable or roentgenographic sign of recurrence of the leg tumor. There was no evidence of any metastasis except those in the right lung.

The right lung was removed on March 25, 1946, by Dr. George R. Minor. The upper and middle lobes were free of adhesions but the lower lobe was covered by avascular adhesions. Only small anthracotic lymph nodes were present in the hilum. The diameter of the upper lobe metastasis was 2.5 centimeters and that of the lower lobe's 2 centimeters. The tumors were highly cellular spindle-cell sarcomas with osteoid matrix. There were marked pleomorphism and many division figures. Tumor thrombi or emboli were present in veins, and masses of neoplasm in bronchi. This report of Dr. W. A. Stryker of the Department of Pathology states that the primary neoplasm was probably osteogenic.

The patient was discharged on April 9. Check-up roentgenograms on May 17 showed for the first time a rounded lesion in the lower left lung, measuring 2 by 3.5 centimeters; on September 10 it measured 5 by 7 centimeters. The lesion had failed to respond

to x-ray therapy, 600 roentgens having been given to each of two fields on May 22 and 23. The patient was seen for the last time on September 25 when he appeared cachectic. He was dyspneic and had great pain in the region of the thyroid cartilage on swallowing or turning his head toward the left. Almost certainly he will soon die from progression of his metastases.

Well 3½ months after lobectomy, which was 6 years after removal of carcinoma of colon.

Dr. Paul C. Samson's patient No. 1,[5] a man now 69 years of age, a bank employee, had a right-sided colectomy for carcinoma in mid 1940. A chronic cough of 30 years' duration increased late in May, 1946, and during the next week blood was expectorated. There was no loss of weight or chest pain. X-ray films showed a rounded mass, 3 inches in diameter, in the left lower pulmonary lobe. Bronchoscopic biopsy showed only inflammatory tissue. The mass increased in size during the period of a month. On July 12, 1946, the left lower lobe was removed. Lobectomy was chosen instead of pneumonectomy because (1) frozen sections of the hilar lymph nodes showed no malignant cells, (2) the tumor was in a peripheral location and (3) the patient was quite elderly. Several degenerated areas in the soft tumor contained mucoid material; the lining was composed of highly differentiated mucoid adenocarcinoma with papillary ingrowths, microscopically almost identical with colon carcinoma.

The last check-up examination was on November 1, 1946, when there were no symptoms or fluoroscopic evidence of recurrence.

Convalescing 1 month after pneumonectomy, which was 5½ years after nephrectomy for carcinoma.

V.A.B., No. 254,460, a man of 53 years of age, a machinist, had a left-sided nephrectomy by Dr. Reed Nesbit for a renal cell carcinoma on April 5, 1941, following 2 weeks of symptoms and a single episode of hematuria 2 years before. Roentgenograms in 1941 showed no sign of a pulmonary neoplasm. In 1944 he had symptoms suggesting the possibility of coronary disease but this diagnosis was not established by examinations.

In May, 1946, the patient began to cough, had a fever of 102 degrees and pain in his right chest. Bronchial pneumonia of the right mid lung was diagnosed elsewhere. Improvement with penicillin was rapid and x-ray films during the next month showed a definite decrease in the area of pulmonary infiltration. Roentgenograms of July 16, 1946, showed a smoothly marginated triangular area in the right upper lung (Fig. 18). A month later there was almost no change in this shadow but the films of October 3 showed an increase in parenchymal density.

The patient was admitted to the University Hospital on October 18, 1946. No physical findings of importance were found except in the region of the pulmonary lesion; no mass was felt in the renal regions; the blood pressure was 140/86, but there was no evidence of cardiac disease and an electrocardiogram was "not outside the normal limits."

Bronchoscopy was performed by Cameron Haight on October 21; no neoplasm could be seen, as was also so when bronchoscopies were carried out on July 7, August 23 and October 4. Haight removed the right lung on October 25, 1946. The upper lobe was densely adherent anterolaterally. A 5 centimeter diameter yellowish neoplasm was present centrally in the upper lobe; a 1 centimeter nodule was present in the apex of the lower lobe and there were several similar nodules in the upper lobe. Bronchiectases occupied that part of the upper lobe whose bronchus was obstructed by a neoplastic nodule. A 1 millimeter nodule was removed from the parietal pleura near the neoplasm; Dr. A. J. French of the Department of Pathology reported this as being a malignant neoplasm, probably carcinoma, but control sections did not show any malignancy. Dr. R. C. Wanstrom reported that the pulmonary neoplasm was a widely infiltrating metastatic hypernephroma; there was no involvement of the bronchial lymph nodes.

Two days after operation a sudden jump in the pulse rate to 170, for which no extracardiac explanation was available, caused the making of an electrocardiogram, which showed marked notching of the P waves, suggesting an auricular change. Two days later an electrocardiogram showed auricular flutter with a ventricular rate of 188 and an auricular rate of 376, or possibly paroxysmal tachycardia with a 1 to 1 response. The following day, after digitalis, the pulse rate was 108; the electrocardiographic diagnosis was unchanged. All the electrocardiographic interpretations were made by Dr. Frank N. Wilson. On November 25, 1946, 1 month after operation, the temperature was normal, the pulse approximately 110 and the patient was in a moderately satisfactory general condition. Several days before, when the digitalis dosage was temporarily reduced, the auricular fibrillation returned. This case is added to the series so soon after operation only because the series includes all cases known to us in which both the primary and initial metastatic pulmonary lesions have been removed. The ultimate prognosis seems poor because there were several nodular neoplasms, in addition to the chief neoplasm in the right lung.

[5]The records of Dr. Samson's second and third patients, both of whom were operated upon recently, were not available when this article was completed.

SUMMARY

1. The appearance of a solitary metastatic lesion in a lung months or years after the removal of a primary extrapulmonary sarcoma or carcinoma is far from rare.

2. Only 5 adequate case records showing the results of the resection of the metastatic pulmonary lesion have been published. Nineteen additional records are included in this article.

3. One of the 24 patients died as a direct result of the pneumonectomy or lobectomy operations. Eleven have had recurrence of the neoplasm and 12 have had no recurrence.

4. Among the 12 patients with no recurrence, 8 are apparently well 12, 7, 6, 5, 4, 3, 1¼ and 1 years, respectively, after the pulmonary resection operations. Four patients were operated upon too recently for evaluation.

5. Six of the 8 sarcoma patients, but only 6 of the 15 carcinoma patients (excluding the 1 who died as a result of operation) are apparently free of recurrence. Two of the 6 sarcomas and 2 of the 6 carcinomas, however, were operated upon less than 10 months ago. Four renal cell carcinoma patients (including 1 operated upon a month ago) are free of recurrence. Only 2 other carcinoma patients are free of recurrence, one 3 years and the other 3½ months after pulmonary resection.

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THE DIAGNOSIS OF ABDOMINAL TRAUMA IN WARFARE

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MANY papers have been written on the treatment of the abdominal gunshot wound but the diagnosis has received less attention. In my opinion, a careful preoperative examination and diagnosis in these cases is amply justified by the number of lives saved. During the first 6 months of 1944, 560 laparotomies were performed on British battle casualties in Italy. A visceral lesion was not found in 66 (12%) of these cases, and of these 66, 29 per cent died; the unnecessary laparotomy being a major cause of these 19 deaths. During the same period 50 laparotomies (9% of the total cases) were performed for a wound of the liver or kidneys only. While in some of these full abdominal exploration was necessary for the control of hemorrhage, I would emphasize that with a more accurate diagnosis laparotomy should not have been necessary in the majority. A similar high incidence of negative abdominal exploration has occurred in other theaters of war (Table I). The importance of avoiding an unnecessary laparotomy in battle casualties is absolutely imperative, the attitude of "let's look and see" has no place in field surgery, until a full clinical examination and sound diagnosis has been made.

This paper is based on 172 cases in which patients were admitted to, and treated at, an advanced surgical center in Italy. For about half of them the location was a field dressing station where no x-ray apparatus was available; for the remainder a casualty clearing station with its added facilities, including an x-ray plant. The average time at which operation was performed was 6.4 hours after wounding. All patients were retained for a minimum of 10 days, the majority for longer, but the follow-up has been incomplete. However, no patient was evacuated until on a full diet, his bowels acting regularly, and the peritoneum clinically free from residual abscesses. The only exceptions were 3 patients with pelvic abscesses, who had to be evacuated before the abscesses had resolved, and these are known to have recovered.

All the 172 admissions showed marked and definite clinical abdominal symptoms and signs, and in all a diagnosis had been made by a medical officer, of a penetrating wound of the abdomen. Of these 172 patients, 6 (3.5%) were brought in dead or were moribund on ad-

TABLE I.—THE INCIDENCE OF A POSSIBLY UNNECESSARY LAPAROTOMY

	Total laparotomies	No visceral lesion		Liver of kidney only	
		No.	Per cent	No.	Per cent
Ogilvie, W. W. Western Desert 1942–1943	247	42	17	38	15.3
Edwards, H. C. and Stead, G. Italy, 1944, Jan.–June	560	66	11.8	50	8.9
Porritt, A. E. 21st Army Group 1944–1945	4319	740	17.1	880	20.3

TABLE II.—ANALYSIS OF 166 CASES WITH DEFINITE ABDOMINAL SYMPTOMS AND SIGNS

	Cases
1. *Laparotomy performed* (Deaths 39)	113
a. Necessary (wounds of the hollow viscera or wounds of the solid viscera in which hemorrhage necessitated laparotomy)	102
b. Unnecessary	11
Liver or kidney only	9
Retroperitoneal tissues	2
2. *Laparotomy not performed* (wound excision only) (Deaths 1)	53
a. Extraperitoneal hematoma	14
b. Thoracoabdominal or abdominal wound with a hemoperitoneum (liver or kidney only)	9
c. Chest wound with abdominal signs	7
d. Buttock wound with a fractured pelvis	6
e. Kidney wound (without a hemoperitoneum)	4
f. Localized peritonitis in a wound more than 36 hours old	4
g. Extraperitoneal wound of the bladder	3
h. Spinal wound with paraplegia and hyperesthesia	3
i. Blast injury	2
j. Colon (extraperitoneal only)	1

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mission and died at a very early stage of resuscitation; the remaining 166 (96.5%) were operated upon.

It may be seen with the aid of Table II that:

a. In 113 patients a laparotomy was performed, and in 53 a wound excision without abdominal exploration.

b. Over half of these patients had other wounds in addition to those involving the abdomen, and in 20 per cent these were of first priority degree in themselves.

c. There were 40 deaths in this series.

d. There were 39 deaths among the 113 patients who had a laparotomy, and only 1 death among the other 53 patients in whom I elected not to open the abdomen.

e. Of the 39 patients who died after laparotomy, 17 had associated first priority lesions such as extensive muscle wounds, gas gangrene, traumatic amputations, major fractures, cerebral wounds, etc.; 14 had associated minor wounds; in 8 the abdominal was the only wound.

f. Unnecessary laparotomies were performed in 11 of which 9 (8% of the total laparotomies) were for liver or renal wounds, and 2 (2% of the total laparotomies) were for injuries to the retroperitoneal tissues. The criterion taken for an unnecessary laparotomy has been one in which nothing except exploration was done, and in which recovery followed.

g. Of the 53 patients treated without laparotomy, 13 (25%) had intraperitoneal lesions, and of these every one recovered. The remaining 40 (75%) had wounds of the structures in close relationship to the parietal peritoneum; of these one, a spinal wound with paraplegia and abdominal hyperesthesia, was the only patient who died.

h. In 34 patients there was a wound of the liver, either with or without an associated visceral lesion. In only one of these was surgery necessary for the control of hemorrhage.

i. In 22 patients there was a renal wound, either with or without an associated visceral lesion. In only 3 of these was nephrectomy necessary.

The effects of other wounds on the mortality of abdominal surgery in war is marked. In a series published by Lieutenant Colonel Guy Blackburn and myself, the mortality for abdominal wounds without other first or second priority wounds was 25 per cent; but in association with these wounds it was 42 per cent.

DIAGNOSIS

It is essential to see the wood as well as the the trees, by which is meant that a general survey of the patient is the first consideration. What is the state of the peripheral circulation? What is the blood pressure and the pulse pressure? What is the pulse rate?

Practically every patient has already been given morphia to allow him to undertake the journey back. With increasing experience and in spite of a considerable reduction of abdominal pain and rigidity, an accurate diagnosis can still be made in these heavily morphinized patients.

Further factors to be considered are:

1. The state of dehydration of the patient. The majority of patients with war wounds of the abdomen are dehydrated when seen.

2. Resuscitation usually takes a matter of some hours, which enables the surgeon to review the case on more than one occasion; this is important because the clinical picture varies from hour to hour. And I would here mention that a valuable diagnostic pointer is given by the fact that most patients without a lesion of the alimentary tract either do not require resuscitation or respond rapidly. An exception may be made by cases with severe hemorrhage or associated other first priority wounds.

3. Age. In this series age ranged from 17 (that of a German prisoner of war) to 40.

4. Fighting fit soldiers usually have an abdominal wall of high muscle tone, which in itself is a trap for the unwary.

5. Owing to the mixed racial composition of the Allied Armies in Italy, marked differences of temperament had to be evaluated.

There is no difficulty of diagnosis in many patients: they may show an abdomen with the general rigidity and tenderness, the absence of respiratory movements, and the silence on ausculation of general peritonitis; or there may be a prolapse of viscera through the wound. The problem arises in the less obvious case, and before discussing individual lesions there are two physical signs of fundamental value in all cases. These are: (1) an efficient clinical estimate of the wound track, and (2) ausculation of the abdomen.

A CLINICAL ESTIMATE OF THE WOUND TRACK

A clinical estimate of the wound track can be obtained by the following:

1. *The preoperative appearance of the wounds*, including the relationship of the exit wound if present, to the wound of entry, and a statement from the patient as to the posture he was in when hit. This latter is important and explains many unusual wound tracks. It has

been my experience that missiles take a straight course from one point to another unless deflected by bone. I well remember a patient with a wound just above the right inguinal ligament and the foreign body lying in the right ischium. At operation the only lesion found was a laceration of the hepatic flexure of the colon, and subsequent inquiry elicited the fact that he had been bending to adjust his boot when wounded.

2. *The usual routine clinical examination*, particular attention being paid to those symptoms and signs of localizing diagnostic significance.

3. *Rectal examination and catheterization* have been of importance in tracing the track of many missiles.

4. *A radiological examination*, when available, to locate foreign bodies and to demonstrate fractures. This has been of most value in wounds of the upper abdomen and lower chest where the foreign body may be located in the liver or thorax; wounds of the buttock where the foreign body may be retained in a fractured ilium; and wounds of the extraperitoneal regions.

5. *The findings at wound excision* which has been performed in every case. When patients are fit for the theater and whether laparotomy is to be performed or not, I first of all excise every wound which might have penetrated the peritoneum. *This is essential and, in my experience, exploration of the wound track in the operating theater has often been the deciding factor for or against opening the abdomen.*

AUSCULATION OF THE ABDOMEN

It is important to ascertain the presence or absence of peristaltic sounds. These may be mimicked by sounds due to a fluid-gas mixture in the bowel itself, particularly when the gut is distended. These can be reproduced by rolling the patient and listening at the same time, but with experience there is no difficulty in differentiating them from peristaltic sounds. Ausculation of the abdomen has been performed on every case in this series, when necessary on more than one occasion and for 2 or 3 minutes at a time, until the presence or absence of peristalsis has been established beyond doubt.

In an analysis of abdominal ausculation in a total of 166 cases, the following was noted:

In the presence of a lesion of a hollow viscus peristalsis was present in 6, absent in 89. In the absence of a lesion of a hollow viscus, peristalsis was present in 70 and absent in 1.

Thus in only 1 per cent of those patients without a hollow visceral lesion was peristalsis absent; in this patient who had a large posterior extraperitoneal hematoma the abdomen was silent throughout. Laparotomy in this case was one of the two unnecessary laparotomies performed for extraperitoneal hematomas. However, in those patients with a lesion of a hollow viscus, 94 per cent had no peristaltic sounds. In 2 patients with small intestinal wounds, 3 patients with wounds of the colon, and 1 intraperitoneal wound of the bladder, peristalsis was heard. In these there was little leakage from the bowel and minimal peritoneal soiling; and I am convinced that peristalsis is only absent when the activity of all the intestine has been inhibited by a general peritoneal soiling, although before this a local silence occurs immediately around the perforation. The following patient seen in consultation with Lieutenant-Colonel A. J. Latchmore, R.A.M.C., illustrates this point well.

Patient had received a machine gun bullet wound 2½ hours before admission. The bullet's entry was anteriorly just to the left of the midline at the level of the sixth rib and its exit at the level of the 10th rib in the posterior axillary line of the same side. The abdomen was tender but soft, peristalsis could be heard; as the patient was very distressed, he was sat up. Immediately he complained of great abdominal pain, so after 5 minutes he was laid down again. On examination the abdomen now had generalized rigidity and tenderness with complete silence on ausculation. At operation a large tear of the stomach was found. It appears that when this patient sat up, his gastric contents, which previously had been localized to the upper left abdominal quadrant, were spread rapidly over his entire peritoneum, thereby producing the sudden change of abdominal physical signs

Therefore, I submit that the absence of peristaltic sounds, confirmed and reconfirmed, is a positive indication for laparotomy; but that the presence of peristaltic sounds is only a valuable guide toward, and not a positive indication for, conservative treatment.

FURTHER DIAGNOSTIC POINTS

Certain points have been of particular help in the various case groups.

Extraperitoneal hematoma. When in the anterior abdominal wall, the rigidity and tenderness have been localized to the wounded region, and occasionally there is local surgical emphysema due to respiratory movements sucking air along the wound track, the foreign body may be palpable, but if the wound is through-and-through as it often is in the loin, the possibility of a rupture of the intestine, even with an intact peritoneum, must be considered if the missile is a bullet. Occasionally these hematomas are large as when the deep (inferior) epigastric artery has been injured.

Posterior extraperitoneal hematomas have been diagnosed by the mild rigidity if light palpation is employed, and by the presence of peristaltic sounds. Tenderness, however, may be extremely great over the localized area of the hematoma, and peristaltic sounds are themselves sometimes faint and require patience to detect; in these cases the possibility of missing an extraperitoneal tear of a fixed portion of the intestine has been avoided by a careful wound excision and exploration. In cases seen late ileus distention may be marked.

In pelvic extraperitoneal hematomas rectal examination, both digitally and with a proctoscope, has been invaluable, for while tenderness may be deceptive due to extraperitoneal bruising, it is by this measure alone that a peritonitis of the rectovesical pouch can be diagnosed, before it has spread to the general peritoneal cavity; these cases are usually associated with buttock wounds and fractures of the pelvic bones. On two occasions wound and wound track excision and exploration were followed by an extraperitoneal exploration above the inguinal ligament and removal of a foreign body from the pelvic fascia; in one of these the termination of the descending colon was lacerated extraperitoneally and suture with drainage, but without laparotomy, was successful.

Wounds of the liver. It has been my experience that of 34 such patients in only one was surgery necessary for the control of hemorrhage. These cases of simple hemoperitoneum form a large and important group of abdominal war wounds, because they are one of the few intraperitoneal lesions in which laparotomy is not necessary. An x-ray film is invaluable when the foreign body has been retained, as an adequate estimation of the wound track may be impossible without one. In the majority of the unnecessary laparotomies of this series, the course of the missile could not be estimated because an x-ray machine was not available. The presence of some abdominal wall movement with respiration, of a mild rigidity on light palpation, and of peristalsis by abdominal ausculation have all aided the diagnosis. In no case where the liver was the only lesion was peristalsis absent, although in several patients a large and diffuse hemoperitoneum was present. These patients have been watched very carefully for further bleeding, but in only one case did this necessitate operation. I would remind you of the ease with which hemorrhage from the liver may be restarted by the laparotomy itself, and in some cases of the extreme difficulty of controlling it again.

Wounds of the kidney. War wounds differ in many respects from the closed traumatic injuries of civilian practice. In the former, one does not see the large swelling of the perinephric tissues, nor does one meet the typical pain and colic at an advanced surgical center, although the last named has been noted during convalescence. On palpation local tenderness and rigidity can be elicited. Catheterization is essential for without exception in this series hematuria has been present. At operation, wound excision and exploration will show the track of the missile, and the opportunity is taken for accurate palpation of the kidney. As a result of this palpation, an estimate can be made as to the necessity for nephrectomy, and it has been my experience that the majority can be treated expectantly. In this series, of 22 renal wounds only 3 required immediate nephrectomy. It is possible that in some cases removal of the kidney is done at a later date, but such patients are better fitted then to stand the operation. Various reconstructive operations have been recommended for these renal lacerations, but in field surgery they are unsafe and the immediate results of simple drainage appear to be very satisfactory.

Wounds of the ureter. I myself have met no case of injury to either ureter distal to the renal pelvis.

Bladder wounds are either intraperitoneal or extraperitoneal. The fact that the bladder has been injured rarely presents difficulty in diagnosis. Occasionally, due to a wound of the abdominal wall, it may be impossible to tell by abdominal examination whether the bladder is full or empty; in these cases a rectal examination and catheterization will solve the problem. But when the bladder is the only visceral lesion an intraperitoneal rupture may not be found before the wound has been explored. Suprapubic cystostomy has to be performed on both groups, and this procedure, combined with drainage of any extraperitoneal urinary extravasation, provides an ideal opportunity for assessing the damage.

Chest wounds with abdominal signs. If there is only an entry wound present in the thorax, an x-ray film is invaluable to determine the relationship of the foreign body to the diaphragm. With the portable x-ray apparatus available in forward areas, a lateral film, although essential, is unsatisfactory, screening is impossible, and reliance has to be placed on the anteroposterior film alone. On the right side, this is of little moment, because if the foreign body is just below the diaphragm, it will be in the liver. However, on the left side, the diagnosis may have to rest on a full clinical examination. If there is a continued absence of peristalsis, the foreign body has injured a hollow viscus. When the chest alone is injured, there is usually some abdominal breathing, abdominal tenderness is slight, and rigidity, located only on the side of the chest wound, is generally mild, relaxes with respiration, and tends to abate with rest. A correct diagnosis should be possible in all these cases.

Wounds of the buttocks. These form one of the more common wounds of this war. When the track penetrates the peritoneal cavity, there is a considerably higher mortality than with abdominal gunshot wounds via other routes (1). Unusual wound tracks are commonly encountered from this region, usually due to posture and to the fact that the buttock forms a pivotal point between the trunk and lower limbs. As a result it is not unusual for the foreign body to be found as low as the knee or as high as the shoulder. An x-ray film is of obvious importance for the location of these missiles, and when the foreign body has fractured the pelvis, the film must be carefully inspected so that bone fragments which may have been driven into the peritoneal cavity are not missed. I have had a case in which the colon was perforated by a spicule of ilium. These wounds should be under very strong suspicion until a very careful clinical examination has excluded damage to the alimentary or urinary tracts. The importance of localized abdominal rigidity, rectal examination, proctoscopy, and catherization has already been stressed. Gas gangrene is an ever present danger, and a thorough wound excision must be carried out.

Spinal wounds with abdominal hyperesthesia. Such patients, if seen early, present no special difficulty of diagnosis. It is those patients seen late when abdominal distention has occurred, who present the problem. Should a laparotomy be performed? What are the points of differential diagnosis? The ileus distention of spinal wounds comes on much sooner than the distention of general peritonitis. In a spinal cord lesion, tenderness and hyperesthesia are localized to the segment just above the paralyzed level; on the other hand, rigidity, like pain, is a sign of doubtful value in the diagnosis. Peristalsis may be very faint in these cases, but in this series it has always been present. Paraplegia, because of its possible association with an abdominal visceral lesion, has no value in the differential diagnosis. Priapism has been noted in these cases, but I have never seen it with an extraperitoneal hematoma.

Late wounds. Patients seen more than 36 hours after visceral perforation differ but little from similar disasters of civilian practice. Four patients had lain on the battlefield for long periods, and upon admission showed localized abdominal signs, findings similar to that presented by an appendix mass. The lesions were thought to be of the colon only, and they were treated without laparotomy. Subsequently 3 developed a local abscess which required drainage, and of these 2 had a temporary fecal fis-

tula. In this series there were a further 8 late cases, all admitted with advanced generalized peritonitis and desperately ill. Of these, 3 were opened and closed again immediately, as their general condition would not stand the multiple visceral repairs necessary. In the 5 remaining, all their abdominal lesions were surgically treated, but 3 of these died later. The value of massive doses of plasma in these cases of general peritonitis is enormous. In my opinion, this therapy counteracts the circulatory failure which is due to plasma loss from the inflamed peritoneum, the surface of which is equal to that of the whole body.

Extraperitoneal wounds of the colon. In patients seen early, an extraperitoneal wound of the colon can be diagnosed only at wound excision.

Blast injuries. Naval warfare provides far more cases of abdominal blast injury than does military. They may present an extremely difficult diagnostic problem, and I want to quote in detail the 2 cases of this series.

The first man, a gunner, had a cannon shell wound of the back and left chest, there were very marked abdominal signs, including absence of peristaltic sounds. Resuscitation was commenced, and later on one occasion only I heard very faint peristalsis. In view of this no laparotomy was performed, the chest wound only being treated, and he recovered.

I have no doubt that his abdominal signs were due to the blast effects of the explosive cannon shell.

The second case, an officer, was riding when his horse trod on a Teller mine. The horse was blown to pieces but the officer escaped with severe multiple injuries, and he was in abdominal distress. When I saw him 3 hours after injury, there was a traumatic amputation of one leg at the knee, a compound fracture of the opposite femur, generalized multiple wounds, and his abdomen was rigid and silent. His condition would not have allowed excision of all the small wounds, several of which might have penetrated into the peritoneum. After resuscitation, peristalsis was heard, and in view of this, I decided not to perform a laparotomy. I performed an amputation of one leg, excised the wounds and splinted the other, and he recovered; a laparotomy in addition most certainly would have killed him.

In neither of these cases was an x-ray machine available, and the presence of perforated ear drums was taken as evidence that blast lesions had occurred.

Patients moribund on admission. Six patients (3.5% of the total) were dead or moribund on admission, 3 from severe multiple injuries, 2 from thoracoabdominal wounds, and only 1 from an abdominal wound alone. The thoracoabdominal wounds are of interest because there were 2 of the 3 cases of *diaphragmatic hernia* seen, both had extensive herniation and the diagnosis was easy as the abdominal viscera were presenting through the thoracic wound. The third patient recovered and the diagnosis was made by the presence of peristalsis within the chest, the herniated viscera not being perforated.

I have already emphasized earlier in this paper the extreme difficulty that many cases cause in diagnosis. These patients reach an advanced surgical center heavily morphinized and often without abdominal pain. Because of this an abdominal lesion may be completely missed, a possibility which must be continually guarded against. The problem arises when the wound of entry is at some distance from the abdomen, and is most commonly found in association with a wound of the thigh, buttocks, or even the neck. The following 2 cases illustrate some of the difficulties.

An Indian soldier was brought to me with the diagnosis of prolapsed viscera. When I saw him it was obvious that an intact peritoneum was ballooning through a gutter wound which had divided both recti abdominis. In spite of this he had the physical signs of a perforated hollow viscus. At operation excision of this gutter wound confirmed the presence of an intact peritoneum, and it was only then that I discovered a small wound of the right loin. This wound penetrated the peritoneum and the small intestine was perforated.

A German medical officer was wounded by a machine gun bullet, which had fractured his right shoulder and produced a right hemothorax. Although a qualified doctor he made no complaint of abdominal pain. The availability of an apparatus enabled an x-ray film of the chest to be taken, and it was only when this demonstrated the bullet to be below the diaphragm that the possibility of an abdominal lesion was considered. Although he still complained of no abdominal pain, clinical examination showed in point of fact that he had a perforated hollow viscus. At operation I removed the bullet from the epigastrium and sutured a laceration of the fundus of the stomach.

On the other hand pain in the legs may be the major symptom, when the lumbar plexus

has been involved in association with visceral damage.

Some of the symptoms and signs which are standard in civil practice have been of little value in the gunshot wound due to a number of factors including the longer time lag, and the more disturbing evacuation. I have already mentioned the variability of abdominal pain, which may be masked by morphine and shock, or overshadowed by the pain of other major wounds. In some cases patients have complained of abdominal pain when peritoneal penetration had not occurred. For example the pain of a retroperitoneal hematoma may be very great. The shoulder tip pain of diaphragmatic irritation has been noted in only 8 patients although a leading question has been put to every English-speaking patient. Except with spinal cord lesions, morphine had rendered valueless the testing for abdominal hyperesthesia.

In civilian practice, rigidity is a sign which has great significance, but its value has been considerably less in the gunshot wound; and an entirely false diagnosis may be made if too great reliance is placed upon it. The boardlike rigidity of a perforated peptic ulcer although it may occur, is uncommon; rigidity too may be marked with wounds of the chest, abdominal wall or buttocks, while in early cases with intestinal perforations it may be absent.

Abdominal percussion will demonstrate shifting dullness; on the other hand the sign of absence of liver dullness is valueless. Four cases of simple liver wound showed a diminution of liver dullness, presumably due to entry of air along the wound track. For the same reason an x-ray film of the abdomen to show gas between the liver and the diaphragm has been of no help. Vomiting may occur in all wounds, and unless the vomitus has distinguishing characteristics such as the presence of blood, the diagnostic value has been slight. Bleeding per rectum is of obvious importance, but bowel actions and the passage of flatus have been without significance. Examination has often revealed a dry furred tongue without an abdominal wound, and urine analysis beyond a search for blood has not been performed.

PLANNING THE LAPAROTOMY INCISION

Correct planning of the laparotomy incision is invaluable. While the greater part of the small intestine can be examined through all abdominal incisions, this is not so of the other viscera. The most reliable sign for planning the incision has been an estimate of the wound track, but other signs such as hematuria, the vomiting of blood, and localized rigidity and tenderness have been of value. In wounds of the right or left colon, an oblique flank incision saves further soiling of the general peritoneal cavity and allows inspection of the adjacent viscera. The importance of a correct assessment of all the diagnostic facts before siting the incision, and the difficulties encountered through ignoring them, are well exemplified by the only case in which I missed a visceral perforation.

I operated upon a British soldier 3 hours after wounding. There were 3 penetrating wounds of the abdomen centered around the umbilicus, with the signs of general peritonitis and a history of hematemesis. I performed a laparotomy through a right midparamedian incision, sutured 8 perforations of the small intestine, and exteriorized a lacerated loop of transverse colon. I found no obvious lesion of the stomach. This man died after 2 days from general peritonitis and postmortem examination revealed a high perforation of the stomach.

In this case, if greater attention had been paid to the history of the vomiting of blood, an upper paramedian incision would have been made, and the gastric perforation found and closed.

Before I conclude my remarks on diagnosis, there are two further points requiring discussion.

First, Brigadier Charles Donald has suggested making a small abdominal incision and inserting a swab on a holder into the pelvis. If it is blood-stained, then laparotomy is performed. I feel that this does not go far enough because it does not distinguish between a simple hemoperitoneum which might be treated without laparotomy and a perforated hollow viscus which requires an immediate laparotomy.

Second, it has been stated that a through-and-through wound between the lineae semilunares does not penetrate the peritoneum. While this is probably true for fit soldiers, I

have had a case of an Italian civilian female in which such a wound produced multiple intestinal perforations due undoubtedly to her pendulous abdominal wall.

CONCLUSION

The mortality from unnecessary laparotomy demands the greatest care and accuracy in the diagnosis of the abdominal gunshot wound. Although I have stressed the great value of abdominal ausculation and wound exploration, no single sign, or group of signs should be relied on, without a full and careful clinical examination of the patient as a whole.

Finally, where a genuine doubt exists after repeated examinations it is advisable to open the abdomen, but these exploratory laparotomies should rarely be necessary.

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PLASMA CLOT GRAFT OF PERITONEUM FOR PERFORATIONS OF STOMACH

Preliminary Report of an Experimental Study

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THE purpose of this study was to see if it were possible to close a perforation of the stomach with a graft of peritoneum by substituting plasma clot for sutures. Occasionally the surgeon finds a perforated peptic ulcer with extensive induration or a perforated ulceration through a carcinoma so extensive that he is at a loss as to what to do. This type of perforation usually does not lend itself to suture closure because of induration. He might attempt primary resection in the face of infection, but he knows how greatly this increases the risk to the patient. He has attempted in the past to cover the perforation with neighboring organs, but this step frequently fails to give a tight closure and the patient expires from a peritonitis, despite treatment. However, if he could tide his patient over the critical period of perforation, he could get him into better physical condition for more extensive surgery, if it is indicated, later on. The method that will be described is intended for this purpose: to tide the patient over the acute period of perforation, so that the peritoneum can more easily combat the infection due to leakage as well as stop the leak for the time being. No evidence has thus far been obtained on human patients, since no attempt has yet been made in this direction. The present paper is only a preliminary report of the more extensive investigation that is contemplated.

In 1896, William H. Bennett described a method of attacking this problem by the use of an omental plug. He encountered a perforated gastric ulcer in which the area of induration was 3 inches in diameter and the perforation a half inch in diameter. He was unable to suture it so he pulled up the omentum and, after inserting a portion of it into the orifice, sutured it into position by a through-and-through stitch, tacking the rest of the omentum about it. The patient recovered.

In 1927, Martin and Rogers, using balloons, studied the hunger contractions of the stomach. They demonstrated the phenomenon of circular constriction of the lower third of the stomach. They showed that this also took place in the antrum, with a general shortening of the stomach, separating periodically the fundus, body, and pars pylorica. This is quite similar to what takes place in the small intestine. Farkas Gruber showed that proximal dilatation and distal contraction take place in the body, while proximal contraction and distal dilatation take place in the pars pylorica of the stomach.

Although it is well known that the stomach has 3 sets of muscle fibers that produce contractions, there exists a small area on the lesser curvature of the prepyloric region, at the level of the incisura angularis extending for 1 to 2 centimeters, which is almost without longitudinal fibers. This is the most frequent site of perforation for prepyloric ulcers. For this reason, Forsell calls it the membrana angularis. The predominating muscular fiber development at the prepyloric and pyloric region is therefore the circular fibers (5). These produce contractions at right angles to the long axis of the stomach and duodenum. It appears logical to assume that in closing a perforation at this point by suture methods, only sutures placed at right angles to the circular fibers will be effective and they must always include these fibers. However, since this is dependent upon the presence of such holding fibers, the extent of disease when very great precludes the use of this tissue in suturing. A graft closure, therefore, which does not require the use of sutures, should succeed more frequently than

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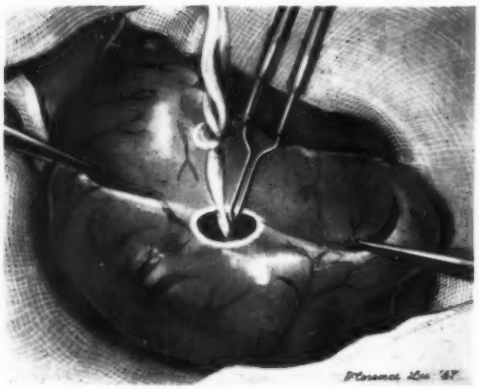

Fig. 1. First stage of experiment. Artificial perforation with cautery.

any type of suture closure. It appears logical to assume that, from the mechanical viewpoint, a successful graft closure using an adhesive method, instead of sutures, would operate independently of the anatomical distribution of the muscular layers of the stomach.

Sano, in 1943, used a sutureless technique to hold skin grafts in place. His method utilized dried plasma and leucocyte cream. His grafts were completely fixed in 4 days.

Cannaday, in 1943, employed strips of skin in repairing hernial defects, and no ill effects came from burying skin in soft tissues. He also used a thromboplastic method.

Young and Favata, in 1944, used thrombin solution on unwashed skin graft and normal pooled plasma on the recipient area.

In 1946, John Devine, an Australian, described the use of peritoneal grafts as a seal to prevent leakage after intestinal anastomosis by suture.

Price and Lee, in their observations of gastric digestion on living tissue, found that there is a great variation in the susceptibility of living tissues to gastric digestion. In the order of their susceptibility, they found first, the seromuscular coats of the intestine and gall bladder, omentum, cartilage, kidney, spleen, lung, liver, and pancreas. The most resistant of all are fibrous connective tissue, skin, and gastrointestinal mucosa.

The present experiment utilized, as the graft of choice, a combination of peritoneum and

Fig. 2. Second stage of experiment. Perforation plugged with oxycel and covered with peritoneal-fascial graft. Schematic representation in cross section.

fascia, as found in the posterior rectus sheath, to either side of the midline. The grafts used were taken at that point where the posterior rectus sheath and peritoneum are fused, almost inseparably.

EXPERIMENTAL METHOD

In order to simulate the induration of a perforated ulcer, in the experimental animals, the perforations were produced with cautery, the heat producing a white coagulated area about the perforation and searing the edges of the perforation.

Nine dogs were used in the experiment. It was felt that, if a graft held under clean experimental conditions, without the presence of infection, then further attempts should be made in the presence of active disease.

The size of the perforation was given considerable thought. If too small, then our purpose would be defeated, as it might then close by itself. If too large, then an autogenous graft of peritoneum of adequate size could not be taken from the animal safely. It was decided to produce with cautery a perforation 0.625 centimeter in diameter through the stomach wall in the prepyloric or in the duodenal area and cook the surrounding tissue so that the perforation would remain open.

All animals were opened through an upper midline incision about 5 centimeters long. The anesthesia for all animals was intraperitoneal nembutal, the amount varying from 2 to 4 cubic centimeters of a solution of nembutal consisting of 1 grain per cubic centimeter of a 10 per cent alcoholic solution. The amount given was on the basis of 1 cubic centimeter per 5 pounds of weight in each animal. Comparatively small animals were used.

Experimental dog 1 was perforated on the anterior wall of the stomach in the prepyloric area. The

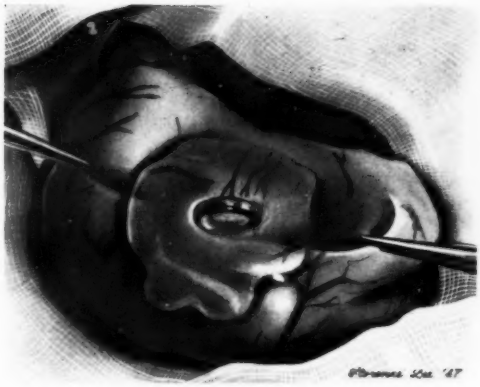

Fig. 3. Drawing showing the external appearance of the fascial-peritoneal graft in place after application of the plasma clot and pressure.

Fig. 4. Healed appearance of the serosal surface of the stomach 1 month after healing by plasma clot graft, over perforation. This healed area can be seen in Figure 5 after section and microscopic study.

patch of fascia-peritoneum 2.5 centimeters long and 1.25 centimeters wide was taken from behind the left rectus muscle. The serosa of the stomach wall was moistened with a few drops of human plasma, while the graft was moistened on the peritoneal surface with bovine topical thrombin solution, 1:5,000. The graft was then spread out over the perforation and allowed to remain there for 3 minutes. The abdomen was then closed in layers, cotton suture material being used throughout. This animal died 24 hours postoperatively. Postmortem examination revealed no free fluid in the peritoneal cavity and no visible exudate. The graft still remained in place over the perforation but one small edge was loosely adherent at one point and may have leaked sufficiently to cause death, apparently from peritonitis.

Experimental dog 2 was operated on under the same conditions. This time the graft was applied after the gastric serosa was moistened with human plasma. A hypodermic needle was then inserted beneath the graft and the topical thrombin was injected under it in a fanwise manner. This graft was 1.25 by 1.25 centimeters in diameter. The animal appeared alive and well for 5 days and was sacrificed to determine the extent of healing. It was discovered that the graft had slipped 2.5 centimeters from the original site of perforation, but that the perforation had become covered by the liver sufficiently enough to prevent, for the time being, a spill and subsequent peritonitis. The fascial-peritoneal graft, however, had become adherent to the serosal surface of the stomach 2.5 centimeters away.

Experimental dog 3 was operated on in the same way. A graft 2.5 by 1.87 centimeters was placed over the perforation. Plasma and topical thrombin were again used as an adhesive agent. This animal died 24 hours postoperative of a fulminating peritonitis. Postmortem revealed the fact that the graft had completely slid off the stomach wall and lay free in the peritoneal cavity permitting the gastric contents to pour through the perforation quite freely. The graft was found to have a pale appearance as though it had undergone a bleaching process, perhaps from the digestive action of the gastric juices. The peritoneal cavity was filled with a purulent flaky fluid, the intestines were matted together with a plastic-like exudate and distended. The perforation was wide open. Nature had not been able to cover this opening with any of the neighboring organs such as omentum, liver, or contiguous intestinal loops.

Experimental dog 4 was subjected to the same procedure except that, for the first time, the idea of packing the perforation was introduced. This was done with the use of oxidized cellulose gauze. The excess, after filling the perforation, was then cut off flush with the gastric serosa, and the human plasma placed on and around the plug. The graft was then placed over the perforation and topical thrombin was squirted beneath it with a syringe. The animal died on the eighth postoperative day. Another variation was attempted at the time of operation upon this animal in that the usual fascial-peritoneal graft was not taken. In this case, a strip of the falciform ligament of the liver was removed which was quite thick. It appeared quite vascular and more dense than omentum, but was very fatty in appearance and structure. Postmortem findings showed death due to peritonitis. The perforation had leaked past some of the plug. Most of the latter, however, had remained undisturbed in the perforation, but had turned a soft mushy green, with gastric juice oozing out from along side of it, at one point. However, there was no sign of the fatty patch from the falciform ligament. It may have been completely digested, but because of the purulent exudate filling the peritoneal cavity, this could not be determined objectively.

Fig. 5. Microscopic section through healing graft, 1 month postoperative. The arrow indicates the junction of the graft with the original serous surface of the stomach. ×85.

Experimental dog 5 was operated upon similarly but a fascial peritoneal graft was used over the perforation. Again a plug of oxycel gauze was used in the manner described above. However the fascial peritoneal graft was held in place by a clamp during the procedure for a period of 3 to 5 minutes, with the hope that the pressure, under direct vision would enhance the adhesive process assuring complete sealing of the graft. This animal was reoperated upon 32 days later and will be described later on when the type and degree of healing over the perforation will be revealed.

Experimental dog 6 was subjected to the same operative technique as dog 5 except that a pressure clamp was used which did not permit complete direct vision of the graft while it was held in place. This clamp failed to hold down the edges of the graft, allowing the perimeter to curl up, permitting a leak to develop at one edge, thus causing death from peritonitis on the sixth postoperative day.

Experimental dogs 7, 8, 9 all lived for a month or more after the operation described above on experimental dog 5. The graft used in each of these cases was fascia-peritoneum from the posterior rectus sheath, aponeurosis, and peritoneum. In addition to the oxycel plug used, the same type pressure clamp was again used, in the same manner. This clamp offered obvious advantages over the opaque metal clamp used on dog 6.

Thus we had 4 dogs surviving 1 month or more after closure of a perforation of the stomach by application of a graft, without the use of any type of suturing. It will be noted that the animals that survived all received the same treatment in the application of the graft over the perforation. All had a plug of oxycel gauze placed into the perforation. The graft was applied and held in place by a pressure clamp that permitted direct vision of the entire patch of tissue used in the graft. Dog 5 lived 32 days; dog 7, 33 days; 8, 36 days; and 9, 35 days. All these latter animals were either sacrificed or subjected to a partial gastrectomy in order to obtain the gastric specimen for microscopic study of the healing produced.

In sacrificing these animals, the factor determining survival time was the selection of a period during which complete healing seemed assured.

The type of healing is seen in the photomicrographs presented. The gross and microscopic features were the same in all animals. Sections of tissue were taken from dogs 5, 7, 8, and 9 after about 1 month or more of healing, some 32, 33, 36, and 35 days, respectively, after grafting. All slides showed that dense, strong fibrous healing had occurred. In all sections the mucosa had regenerated and spread across the artificially created perforation. Strong fibrous union developed across the serosal and muscular layers, with an increase in thickness of the stomach wall at that point.

In those animals that did not receive pressure to their graft initially, all developed some type of leakage or slipping of the graft. Those that had no oxycel plug died in 24 hours, although one animal died after 5 days, living that long only because the liver had covered the perforation accidentally. The oxycel plug allowed dogs 4 and 6 to live 8 and 6 days, respectively, but if the graft had held, leakage would not have taken place. The purpose of the plug is twofold. It acts as a bulwark against the intragastric pressure which tends to blow the graft

off and, secondly, being of cellulose, it is even more difficult to digest than is fascia. The combination of this cellulose plug and a fascial-peritoneal graft appears to hold strong promise in sealing off gastric perforations.

PREFERRED METHOD OF CLOSURE DEVELOPED

1. The perforation should be plugged with oxycel moistened with 1 per cent sodium bicarbonate solution.

2. Pooled human plasma, 1 to 3 cubic centimeters is applied to the serosal surface of the stomach, and plug filled perforation.

3. The graft cut from the posterior rectus sheath of the anterior abdominal wall includes peritoneum as well as fascia and aponeurosis. The graft must be large enough to cover the perforation without being placed on stretch and should cover the perforation overlapping the edges far enough to provide adequate surface contact between graft and gastric serosa, so as to provide a good adhesive surface. The graft should be moistened with 1 to 2 cubic centimeters of bovine topical thrombin, 1: 5,000, and this moistened side applied to the plasma moistened serosal area on and around the perforation.

4. The surface to be applied to gastric serosa should be the fascial side of the graft.

5. The graft is held in place by the clamp described in the article. This clamp has a flat surface which holds the graft in place spread out flat. This flat surface is transparent and of plastic material, fastened to a metal ring clamp by small countersunk rivets. It can take sterilization by pressure boiling without any loss of visibility or wrinkling of surfaces. By its use, it is felt that the edges of the graft are prevented from curling. Curling of the edges may result in an incompletely sealed patch, which may work itself loose, just as a blowout patch on an automobile tire. It is held in place by clamp for 5 minutes.

ANALYSIS OF STUDY

The size of the graft is very important. It must cover the perforation and beyond, as far beyond at least as the diameter of the perforation, more if feasible. The larger the graft, the less likely leakage will take place. It is our impression that autodigestion of the oxycel plug or the peritoneal fascial graft is the least likely cause for failure. The mechanical failure at the time of sealing is the important factor. Meticulous care during the period of grafting will prevent leakage. The cellulose plug and the peritoneal fascial graft have been shown to be markedly resistant to the autodigestion of gastric juice.

TABLE I.— SUMMARY OF RESULTS—9 EXPERIMENTAL ANIMALS

	Technique	Result	Cause
Dog 1	Peritoneal graft, no plug, no pressure	Died—24 hrs.	Peritonitis—leakage
Dog 2	Peritoneal graft, no plug, no pressure	Sacrificed after 5 days	Perforation covered by liver. Graft slipped
Dog 3	Peritoneal graft, no plug, no pressure	Died—24 hrs.	Peritonitis—Leakage
Dog 4	Falciform ligament graft, oxycel plug used, no pressure	Died 8 days postoperative	Graft slid off or was digested. Plug leaked. Peritonitis present
Dog 5	Peritoneal graft, oxycel plug used, pressure applied	Alive after 32 days	Resected for specimen. Slide 2737
Dog 6	Peritoneal graft, oxycel plug, pressure applied	Died 6 days postoperative	Peritonitis—leakage under edge at one point
Dog 7	Peritoneal graft, oxycel plug, pressure applied	Alive after 33 days	Resected for specimen. Slide 2738
Dog 8	Peritoneal graft, oxycel plug, pressure applied	Alive after 36 days	Resected for specimen. Slide 2888
Dog 9	Peritoneal graft, oxycel plug, pressure applied	Alive after 35 days	Resected for specimen. Slide 2887

The graft must be held in place for a sufficient time, 3 to 5 minutes, to allow the adhesive action of the plasma and topical thrombin to take place. The type of pressure clamp used must preferably have a flat surface, and it should permit direct vision of the graft at all times during the procedure in order to prevent the eversion or inversion of the edges of the graft. This is the reason for a plastic, glass simulated faced clamp, as devised by the author. It is also possible to make this clamp in varying sizes to facilitate its use with any size graft desired.

In all the animals, the operative wounds healed by primary intention except in dogs 2 and 9. The former was reoperated upon after the fifth day when it was found that the graft had slipped and had become adherent to the gastric serosa 2.5 centimeters from the original graft site. The perforation had temporarily been covered by the liver, preventing death

from peritonitis. This animal had a local wound infection and if permitted to live would have eventually died of peritonitis and wound disruption.

The oxycel plug in addition prevented the graft from blowing off as the result of the production of intragastric pressure from the muscular contractions of the stomach wall and the swallowed air, which distended the stomach during contractions. This was seen during the operation when the graft was dropped loosely over the perforation prior to using a plug. It was observed that the graft would balloon up during these contractions, over the site of perforation. The plug, therefore, prevented such displacement of the graft. The segmental contractions that oppose each other at the membrana angularis is another mechanical factor that must be given consideration. It is believed that these opposing contractions may be responsible in some measure, for the cutting through of sutures when attempts are made to close perforations through indurations of the prepyloric or duodenal ulcers.

Experimental dog 9, about the 10th day postoperative, developed an incisional hernia which receded without postoperative intervention and on reoperation 35 days later, was found to be only a defect in the abdominal wall itself. The graft had healed completely and was in no way associated with the wound of the abdominal wall. The incisional hernia was in most probability due to poor suture technique in closing the abdomen.

It is with the hope that others may carry on further experimental work along similar lines that this paper is offered. It may possibly develop into a newer and more physiological approach to perforations which are unsuitable for suture closure.

SUMMARY

1. A new experimental method of nonsuture closure of gastric perforations is offered.

2. Nine dogs were used in the experiment. Four survivals of more than 30 days were obtained from the application of an artificial plug and fascial peritoneal graft applied by plasma clot technique.

3. The failures in the experiment are explained on the basis of mechanical defects in the technique of applying the graft.

4. It is hoped that further experimental efforts will be made to develop this technique and apply it to human beings.

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ONE STAGE PANCREATODUODENECTOMY

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PANCREATODUODENECTOMY has become a recognized procedure for the excision of carcinomas of the ampulla of Vater, head of the pancreas, terminal portion of common bile duct, and neoplasms of the duodenum exclusive of the ampulla but invading the head of the pancreas. Whereas there is agreement on the general principles of the operation, there is still discussion concerning details as to the type of gastrojejunostomy to be performed and the question and manner of reimplantation of the neck of the pancreas into the jejunum. It is generally agreed that choledochojejunostomy with or without cholecystjejunostomy is preferable to cholecystgastrostomy or cholecystjejunostomy because the ligated common duct may open with escape of bile and bile peritonitis.

The incidence of pancreatoduodenectomy is still somewhat limited and for this reason the reporting of relatively small series of such operations with their immediate results is in order. In a previous report (1) in 1943 the author summarized an experience based upon 8 operations; the mortality was 50 per cent. In Whipple's collected series (41 cases) up to April 1941, the operative mortality was 27 per cent; in Orr's collected series from April 1942 to November 1944 (35 cases) it was 26 per cent. This report includes 7 personal unselected and consecutive patients operated upon in which sufficient time has elapsed to permit of the evaluation of immediate results.

CASE REPORTS

CASE 1. N.C. (311069), white male, 42 years of age. On October 6, 1943, a partial gastrectomy was performed for what was thought to be a peptic ulcer penetrating into the head of the pancreas. Histologic examination revealed the lesion to be a carcinoma and sections showed that neoplasm had been left behind on the head of the pancreas. On November 20, 1943, the patient was subjected to one stage pancreatoduodenectomy for excision of residual carcinoma in the head. There appeared to be no metastases at this time.

A few weeks following discharge from the hospital the patient's general condition began to deteriorate and he died at home March 21, 1944. Necropsy was not obtained.

CASE 2. E.R. (305306), female, aged 42 years, was admitted to the hospital November 17, 1944, complaining of icterus and pruritus of 6 months' duration; upper abdominal pain for 2 days. There had been a loss of 36 pounds in weight during the previous several months.

On November 22, 1944, a one stage pancreatoduodenectomy was performed for a small carcinoma just within the ampulla of Vater. Study of microscopic sections revealed beginning infiltration into the head of the pancreas. There were no lymph node metastases.

Convalescence was uneventful. Since then the patient's condition has been satisfactory and her existence has been normal as to general health and activity. There are two to three bulky light colored stools a day; the appetite is very good. No evidence of recurrences 2 years and 1 month following operation.

CASE 3. C.P. (349868), white male, aged 49 years. The patient was admitted to the hospital on January 1, 1945, complaining of a sensation of fullness after meals of 2 weeks' duration and loss of 20 pounds in weight during the previous 2 months. Roentgenographic examination revealed a lesion of the pylorus.

On January 29, 1945, a laparotomy was performed at which time a carcinoma of the pylorus was found infiltrating rather deeply into the head of the pancreas. A one stage pancreatoduodenectomy with cholecystocholedochojejunostomy was performed with implantation of the transected neck of the pancreas into the loop of jejunum brought up for the above anastomosis. Study of the specimen revealed metastases in several nodes.

Convalescence was uneventful and there was healing without fistula.

His condition was satisfactory for 1 year during which time he continued to work. On the occasion of a visit to the out-patient clinic a year after the operation a spherical mass 3 centimeters in diameter was excised from within the lumbar muscles. Histologic examination showed this to be metastatic carcinoma.

In October of 1946 he was readmitted to the hospital because of severe upper abdominal pain (no weight loss) and a deep palpable epigastric mass. A second laparotomy was performed, at which time a large mass of recurrent carcinoma in the transverse mesocolon infiltrating the transverse colon and loop of jejunum was excised. He died of shock 3 hours after

From the Department of Surgery, University of Chicago.
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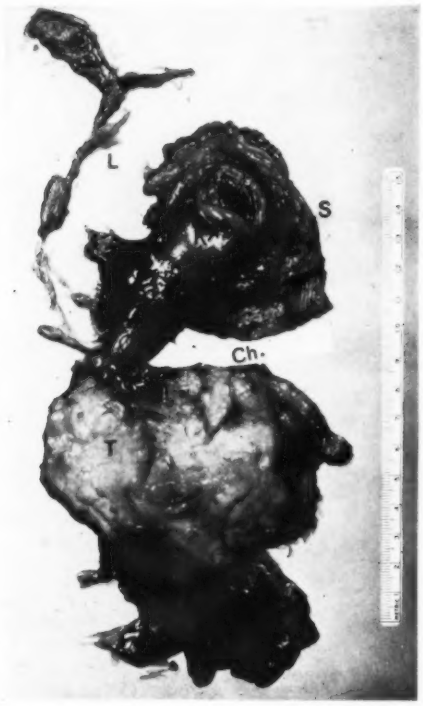

Fig. 1. Photograph of surgical specimen obtained from pancreatoduodenectomy in Case 5. T, Carcinoma in head of pancreas (bisected); S, lower stomach with K, cholecystgastrostomy stoma (this operation had been performed previously in another institution); L, chain of enlarged lymph nodes from porta hepatis resected along with specimen; *Ch*, transected and opened lower common duct.

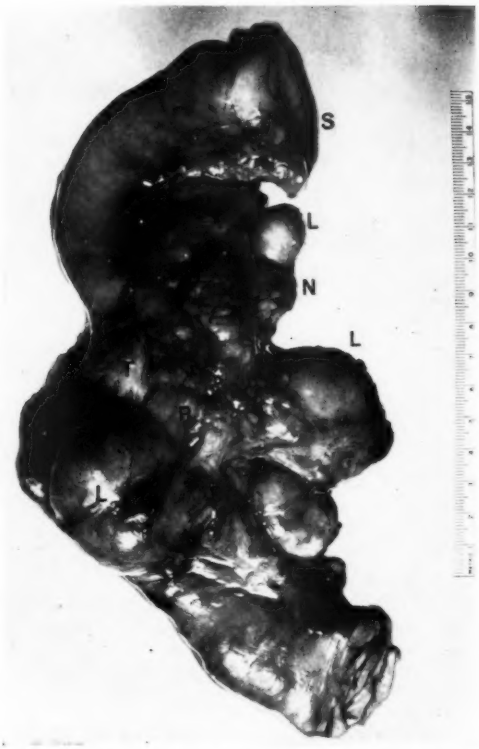

Fig. 2. Photograph of surgical specimen removed in Case 7 showing *S*, lower stomach; entire duodenum and first few centimeters of jejunum; *P*, head of pancreas; *N*, transected neck of pancreas; *T*, carcinoma primary in second segment of duodenum but not associated with the papilla of Vater; *L*, large metastatic lymph nodes from about head of pancreas and in root of transverse mesocolon.

completion of the operation. Necropsy was not obtained.

Case 4. C.T. (351103), white male, aged 71 years, was admitted to the hospital February 2, 1945, complaining of 23 pounds' weight loss during the previous year, constipation for 4 months and postprandial pains for several months. Roentgenograms revealed an irregular constricting lesion in the third portion of the duodenum with ulceration.

On March 2, 1945, a one stage pancreatoduodenectomy was performed with choledochocholecystojejunostomy and implantation of the transected neck of the pancreas into the loop of jejunum. Pathologic specimen revealed an ulcerating adenocarcinoma of the jejunum infiltrating the head of the pancreas. Regional lymph nodes contained two metastases.

Convalescence was fairly satisfactory. He was discharged from the hospital, but his condition deteriorated at home and he died June 13, 1945, 3 months and 1 week after the operation. Necropsy performed elsewhere revealed carcinomatosis.

Case 5. J.M., (378275), white male, aged 54 years. In December 1945, the patient exhibited painless jaundice and received an exploratory laparotomy in another city and cholecystgastrostomy was performed. He was admitted to the University of Chicago Clinics March 18, 1946, showing no icterus and in good general condition.

On March 31, 1946, a pancreatoduodenectomy was performed. The cholecystgastrostomy was taken down and the biliary tract drained by choledocho- and cholecystojejunostomy. Study of the specimen (Fig. 1) revealed the carcinoma in the head of the pancreas to be 7 by 5 by 6 centimeters. The resected lymph nodes contained no metastases. Convalescence was uneventful. His condition remained satisfactory until the early fall of 1946, when he began to lose weight and developed palpable masses in the upper abdomen. He died at home in the early part of December 1946; necropsy was not obtained.

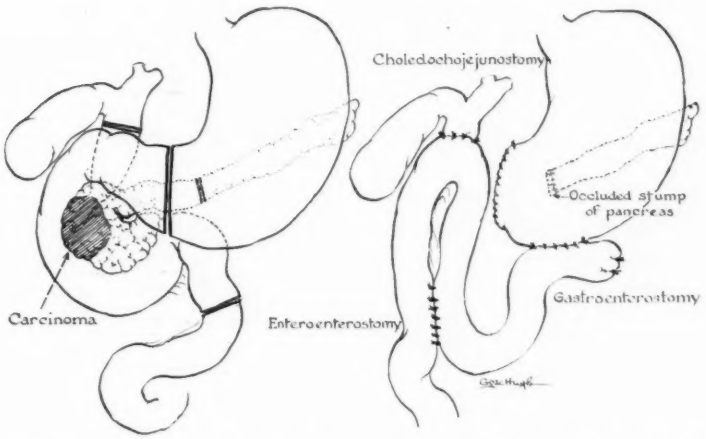

Fig. 3. Diagram of one stage pancreatoduodenectomy without implantation of the transected pancreas into jejunum. (*Surg. Gyn. Obst.*, 1943, 77: 581.)

CASE 6. R.L. (376886), white female, aged 49 years. In October, 1945, at another institution, cholecystectomy was performed for what was interpreted as cholecystitis; 5 weeks later icterus and upper abdominal pain recurred and a second laparotomy was performed at which time a carcinoma of the head of the pancreas was discovered and the abdomen was closed. She was admitted to the University of Chicago Clinics February 27, 1946, with mild icterus.

On March 2, 1946, a one stage pancreatoduodenectomy was performed. Study of the surgical specimen revealed a small carcinoma in the head of the pancreas just beneath the ampulla of Vater. There was metastasis in one of the two lymph nodes examined.

Convalescence was uneventful, a pancreatic fistula persisted for 6 months and then closed spontaneously.

During the spring, summer, and fall of 1946 her condition was satisfactory; appetite was good; there was no gain in weight and there were 2 to 4 bulky light colored stools a day.

In January 1947, two hard rounded masses developed in the abdominal wall beneath the laparotomy scar—obviously recurrences. These were excised and the patient remains well 5 months later.

CASE 7. C.F., white male, aged 38 years, was admitted complaining of upper abdominal pain, distention, vomiting, and 30 pounds loss in weight during previous 6 months.

Roentgenograms revealed a markedly constricting and obstructing lesion in the midportion of the second segment of the duodenum with dilatation of the duodenum above and the stomach.

One stage pancreatoduodenectomy on September 14, 1946. The constricting lesion in the second segment of duodenum was obviously a neoplasm. There were markedly enlarged lymph nodes about the head of the pancreas and in the periaortic region (Fig. 2). The latter were resected separately as a group. Histologic study revealed the primary growth to be a carcinoma. The enlarged nodes showed very pronounced lymphoid hyperplasia with small strands and clumps of metastatic carcinoma cells. Convalescence was uneventful.

June 15, 1947, 9 months after operation, the patient is well, ambulatory and gaining weight. There is a pinpoint pancreatic fistula in the laparotomy scar. He has 2 to 3 light colored bulky stools a day. No special medication. Appetite and strength satisfactory.

RECAPITULATION OF RESULTS

Patient	Pancreatoduodenectomy performed for	Result
Case 1	Carcinoma of pylorus infiltrating head of pancreas	Lived 4 mos. Died of carcinomatosis. No palliation
Case 2	Carcinoma ampulla of Vater	Living and well 2 yrs. 6 mos.
Case 3	Carcinoma of pylorus infiltrating head of pancreas	Lived 1 yr. 9 mos. Received palliation; died with recurrences
Case 4	Carcinoma of third portion of duodenum infiltrating head of pancreas	Lived a little over 3 months; died of recurrences
Case 5	Carcinoma of head of pancreas	Lived 8 months; died of carcinomatosis; received palliation
Case 6	Carcinoma of head of pancreas	Living and well 1 yr. and 3 mos. after operation
Case 7	Carcinoma of second segment of duodenum, not involving papilla of Vater	Living and well 9 months

It may be pointed out that of the 7 patients receiving pancreatoduodenectomy in only 3 instances was the procedure carried out for

primary growths of the ampulla or head of the pancreas. In 2 instances the operation was for carcinoma of the most distal portion of the pylorus with invasion of the head of the pancreas and in 2 instances for primary carcinoma in the second and third portions of duodenum respectively not involving the ampulla but invading the head of the pancreas.

The writer, up to the present, and with exception of Cases 3 and 4 has followed the technique previously described and illustrated again in Figure 3. There is always a pancreatic fistula that persists for several months following this type of procedure. Reimplantation of the transected neck of the pancreas into jejunum would seem to obviate this drainage and hence would appear to be justifiable on this basis alone, not to mention the possibility of returning the pancreatic secretions to the bowel.

For a period following its introduction, pancreatoduodenectomy was regarded as a formidable procedure which entails a high mortality. At present the mortality has become appreciably reduced. Of course, this is the usual course of events as illustrated by the histories of partial and total gastrectomy, combined abdominoperineal resection, etc.

The advances in supportive treatment have permitted such extensions of operative surgery. In regard to cancer necessitating pancreatoduodenectomy, the incidence of very prolonged survival will be dependent upon earlier diagnosis of lesions necessitating this operation; for this reason awareness of these lesions on the part of physicians will influence the ultimate surgical results.

SUMMARY

Pancreatoduodenectomy has become a recognized procedure to deal with cancer necessitating excision of the lower stomach, the entire duodenum, and the head of the pancreas, *en masse*.

A personal series of 7 unselected consecutive pancreatoduodenectomies is reported without surgical mortality.

The relative safety of the operation renders earlier diagnosis of lesions in the ampulla and head of the pancreas all the more imperative in order to achieve an increasing incidence of prolonged survivals.

Addendum.—Since the above report was written, 2 additional pancreatoduodenectomies (one stage) have been performed with 1 surgical mortality. This affords an operative mortality of 11 per cent in a small series of 11 cases. The latter were consecutive and unselected.

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ACUTE INJURIES INVOLVING THE LARGE BLOOD VESSELS IN THE NECK

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INJURIES to the large vessels in the neck occur infrequently. The small size of the neck with respect to its exposed surface and the possibility of decreasing this exposed surface by lowering the chin and raising the shoulders makes the prospect of frequent injuries to this part of the body unlikely. Some of those who sustain injuries to the neck, involving large vessels, succumb immediately from exsanguination, strangulation, or aspiration of blood into the pulmonary tree. Others die shortly after injury from cerebral changes due to the progress of a thrombus or embolus, while still others die from concomitant injuries in the neck.

In addition to the common, external, and internal carotid arteries, there are present in the neck branches of the subclavian artery notably the vertebral artery and the thyrocervical axis with its several branches. Control of bleeding in the neck makes it necessary to have exposed or available in the field access to both the common carotid and subclavian if loss of blood and tissue damage is to be kept at a minimum. Venous bleeding from the internal jugular or subclavian veins may be more difficult to control than arterial bleeding, but methods are available to reduce to a minimum blood loss and additional trauma.

This report concerns 6 patients who sustained injuries to the common carotid artery alone or in conjunction with other vascular injuries in the neck; and, 3 patients who sustained other significant vascular injuries to the neck. The methods employed in the initial management of the cases recorded here are described in the case reports.

CASE 1. Lt. W., aged 28 years, was wounded by a sniper's bullet at 12 noon January 5, 1944 and was admitted to the hospital 6 hours later. He complained of difficulty in breathing and a rapidly enlarging mass on the left side of his neck. On examination there was found an entrance wound below the left chin and an exit wound below the left mastoid. Pulsation of the left temporal artery was not present and "machinery-like" sounds were heard on auscultation over the tense mass on the left side of the neck. At 9:00 p.m. under nitrous oxide-oxygen-ether anesthesia administered through an endotracheal tube the left common carotid artery was exposed through an incision along the anterior border of the sternomastoid muscle below the level of the wounds. A tape was passed beneath the artery for provisional control of the flow of blood. The vessels above the level of the wound were similarly exposed and provisional control of the artery and vein was done. There was a free flow of blood between the carotid artery at its bifurcation and the internal jugular vein. There was an extensive hematoma which had dissected downward to the mediastinum and infiltrated the adjacent fascial spaces. The carotid artery at its bifurcation was lacerated for a distance of 1.5 centimeters. The rent extended obliquely from the common carotid below the internal carotid into the external carotid distal to the origin of the superior thyroid artery. The internal jugular vein had two large irregular perforations with loss of substance (Fig. 1).

The opening in the artery was closed with a fine silk suture. The vein was ligated proximally and distally and the intervening portion was removed leaving neither damaged vessel wall nor a distended vessel segment in the wound. Pulsations were noted in the external, internal, and common carotid arteries at the close of the operation. The skin wound was not sutured but the head was turned to the left allowing closure of the incision.

The postoperative course was uneventful. The patient was evacuated to the base hospital on January 18, 1944 with the wound almost healed. There were no mental or physical disabilities. After study of his condition with special reference to mental or central nervous system changes over a period of several weeks he was discharged to full duty as an infantry officer.

The location of the injury in the artery was such that the control of bleeding by ligature would have required ligations of the common, external, and internal carotid arteries and the superior thyroid artery. That suture of large rents is possible is demonstrated by this case. Anticoagulants were not used but it is likely

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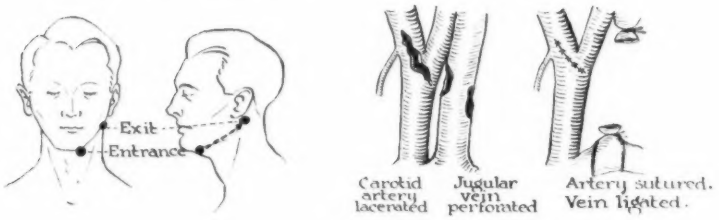

Fig. 1. Case 1.

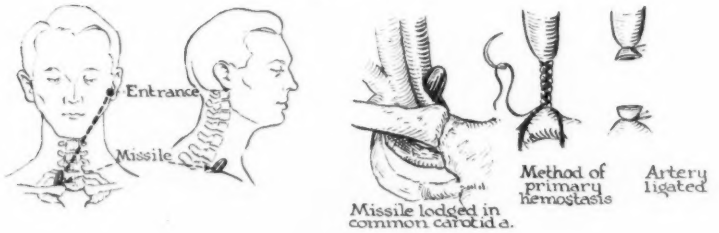

Fig. 2a.

Fig. 2. a, Drawing showing wounds and treatment in Case 2. b, Roentgenograms showing foreign body on right side. Point of entrance was on left side. Tracheotomy tube is in place. Injury to common carotid artery.

Fig. 2b.

that their use is desirable to preclude the possibility of thrombosis in large vessels. Decompression of the fascial spaces of the neck with evacuation of the hematoma is desirable because of the danger of infection in a contaminated wound containing stagnant blood. There was no clinical evidence of infection in the wound at anytime and in the light of subsequent experience provisional closure of the wound may be desirable. However, it is remarkable that positioning the head properly permits closure of the wound without suture and healing takes place with a fine scar.

CASE 2. Pvt. S., aged 20 years, sustained a bullet wound of face, jaw and neck at 9:35 a.m., January 7, 1944 and was admitted to the hospital at 2:15 p.m. of the same day. He was cyanotic and dyspneic from tracheal obstruction and tracheotomy was done at 2:30 p.m. A bullet penetrated over the left malar bone causing a compound comminuted fracture of the left mandible, compound fracture of the hyoid bone and laceration of the trachea. The bullet lodged in the right supraclavicular fossa in front of the 7th

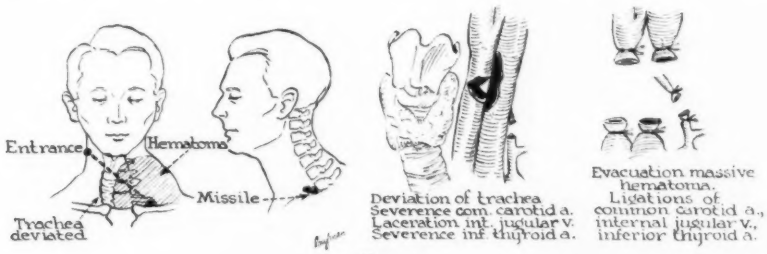

Fig. 3a.

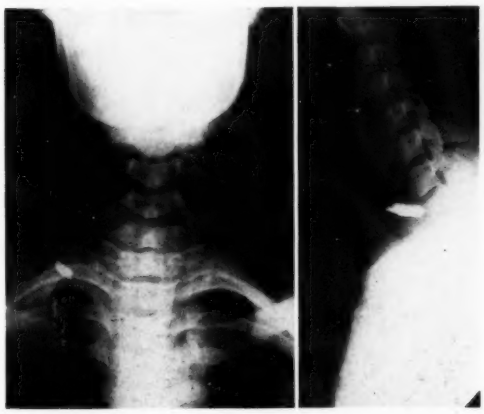

Fig. 3. a, Drawing showing wounds and treatment in Case 3. b, Note displacement of trachea to side opposite to location of vascular lesion. Injury to common carotid artery, internal jugular vein, and inferior thyroid artery.

Fig. 3b.

transverse cervical process. At 12:30 a.m. January 8, 1944, under ether anesthesia administered through the tracheotomy tube, the wound over the left malar bone was cleansed. The deep structures on the right side of the neck were exposed and it was found that the bullet had penetrated the lumen of the right common carotid artery. Removal of the bullet was followed by a free flow of blood. Control of bleeding was effected by the use of a "stick sponge" placed behind the clavicle to compress the proximal portion of the carotid artery. The defect in the artery was extensive. To control bleeding the wound in the artery was closed by suture starting distally and proceeding proximally until the lumen was occluded. The damaged segment was excised after proximal and distal ligations.

The jaws were wired on January 9 and the tracheotomy tube was removed on January 14. The patient was evacuated to the base hospital on January 18. There were no mental or physical changes related to ligation of the carotid artery. When seen 4 weeks later he was making satisfactory progress awaiting healing of the fractured mandible.

The location of the bullet low in the neck with active bleeding upon its removal suggested several more extensive procedures for control of hemorrhage at this level. The method used—obliterative closure of the lumen of the vessel at the level of the damaged segment by the placement of a continous suture starting distally and proceeding proximally until all bleeding was controlled made possible proximal and distal ligations in a dry wound. Cutting the clavicle, resection of the clavicle in part or dislocation of the sternoclavicular joint for a more liberal exposure of this part of the vessel may be necessary in similar instances. However, the method made use of in this case was adequate for the purpose.

CASE 3. Pvt. N., aged 18 years, sustained a shell fragment wound of the neck at 6:30 p.m. January 11, 1944. He complained of difficulty in swallowing, was dyspneic and had considerable swelling of the neck. There was a small wound of entrance on the right side at the level of the cricoid cartilage. All structures in the pharynx were hemorrhagic and edematous. An x-ray study showed considerable deviation of the trachea to the right with a foreign body lodged

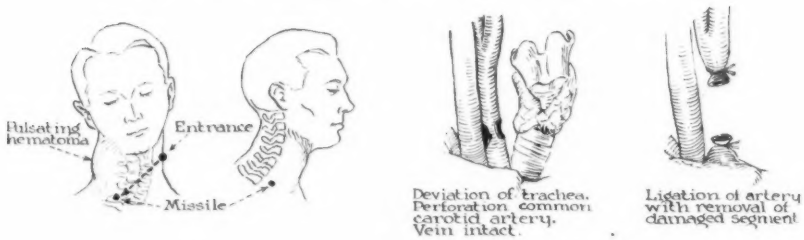
Pulsating hematoma
Entrance
Missile
Deviation of trachea. Perforation common carotid artery. Vein intact.
Ligation of artery with removal of damaged segment

Fig. 4a.

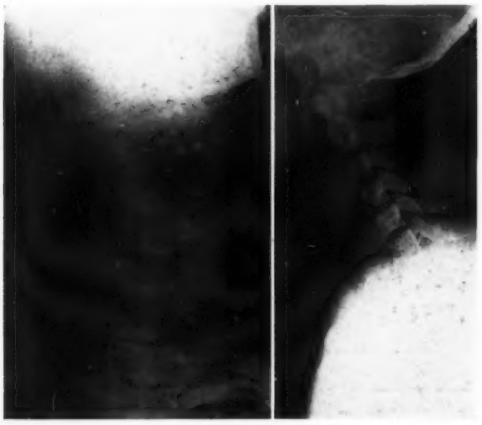

Fig. 4. a, Wounds and treatment in Case 4. b, Note displacement of trachea. Injury to common carotid artery.

Fig. 4b.

in the left supraclavicular fossa. At 6:00 a.m. January 12 under nitrous oxide-oxygen-ether anesthesia administered through an endotracheal tube (after preliminary cocainization of the pharynx and larynx), an incision was made along the anterior border of the left sternomastoid muscle. The common carotid artery was provisionally controlled proximal to the site of the injury. An arteriovenous communication was present. A large accumulation of blood was evacuated from the adjacent spaces. In spite of control of the common carotid artery and internal jugular vein a brisk flow of blood filled the wound. Pressure over the subclavian controlled this bleeding. It was found that the source of this bleeding was the completely severed inferior thyroid artery. The proximal and distal ends of this vessel were ligated. The common carotid artery was ligated proximal and distal to the injured zone and the intervening segment was removed. The internal jugular vein was similarly excised following high and low ligations. The neck wound was not sutured but closed by turning the head to the left. Recovery was uneventful and on January 21, 1944 he was evacuated to the base hospital. There were no mental changes and no central or peripheral nervous system alterations were noted. On February 1, 1944 complete closure of the neck wound was done under nitrous-oxide-oxygen anesthesia. Postoperatively he had a right hemiplegia. During the following 4 weeks he made a gradual recovery and when last seen at that time was up and about, but wrist drop was still present.

Operations under anesthesia which may be associated with anoxemia should not be undertaken for some time after a carotid ligation. A period of 6 weeks to 2 months would not be too long a period. The Matas test is desirable in determining the competency of cerebral circulation.

Secondary closures of neck wounds may be avoided by instituting primary closure or by permitting wound closure without suture by positioning of the head and proper bandaging. Case 1 related previously had no secondary closure for a similar wound but the scar was finer and smoother than that in Case 3.

It may appear ambiguous to caution against anesthesia which may result in anoxia when

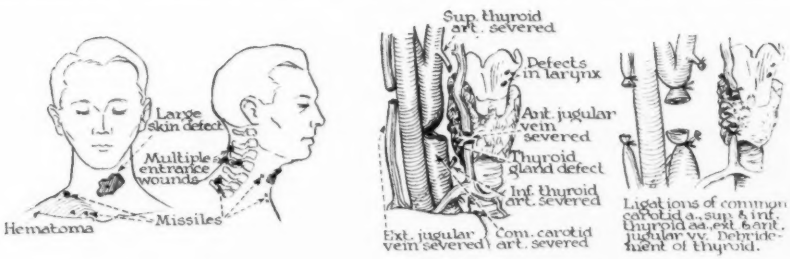
Large skin defect
Multiple entrance wounds
Hematoma
Missiles
Sup. thyroid art. severed
Defects in larynx
Ant. jugular vein severed
Thyroid gland defect
Inf. thyroid art. severed
Ext. jugular vein severed
Com. carotid art. severed
Ligations of common carotid a., sup. & inf. thyroid aa., ext. & ant. jugular vv. Debridement of thyroid.

Fig. 5a.

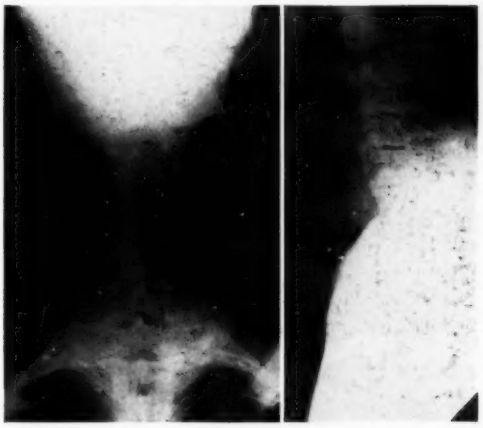

Fig. 5b.

Fig. 5. a, Wounds and treatment in Case 5. b, Zipper fragments within wound. Injury to common carotid, superior and inferior thyroid arteries, external and anterior jugular vein, thyroid gland, perforation of the cricoid.

the immediate operation was done under nitrous oxide-oxygen-ether anesthesia. It must be emphasized that in these patients a special effort is made to avoid anoxia and an adequate amount of oxygen is administered from the very beginning.

It is also possible that an embolus liberated from a thrombus at the site of ligation of the distal end of the common carotid artery was responsible for the hemiplegia although 3 weeks had elapsed since surgery was done. Whatever the reason may be this patient illustrates a hazard associated with damage to a carotid vessel. The need for the prevention of anoxia during anesthesia and for some time thereafter and a technique that will prevent thrombosis with its hazard of embolism are worthy of emphasis.

CASE 4. Pvt. F., aged 19 years, sustained a shell fragment wound of the left side of the neck at 2:00 p.m. February 19, 1944, and was admitted to the hospital at 6:30 p.m. of the same day. He was dyspneic and had a pulsating swelling on the right side of the neck. The wound of entrance was small, located over the sternomastoid muscle at the level of the thyroid cartilage. An x-ray study showed deviation of the trachea to the left with the foreign body lodged in the right side of the neck (Fig. 4). Because of the development of extreme difficulty in breathing a rapid endotracheal intubation was done under light anesthesia. Following this nitrous oxide-oxygen-ether anesthesia was continued successfully and exploration of the right side of the neck was done. After provisional control of the common carotid artery proximal and distal to the site of injury, a hematoma was evacuated and two irregular perforations of the arterial wall were noted. The extent of damage did not warrant suture of the defects since restoration of the lumen was not possible. The artery was ligated proximally and distally and the segment involved was excised. The wound was loosely closed. Recovery was uneventful and on March 10, 1944 the patient was evacuated to the base hospital. He showed no mental changes and there were no central or peripheral nervous system defects noted.

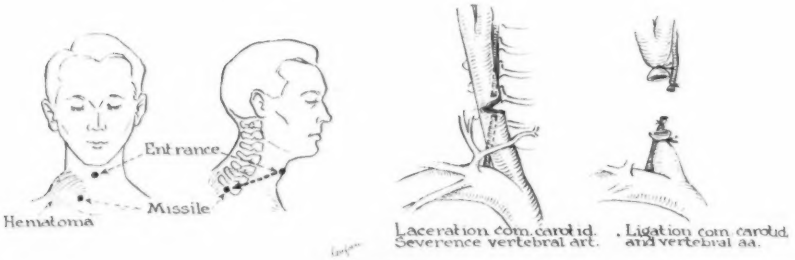

Fig. 6a.

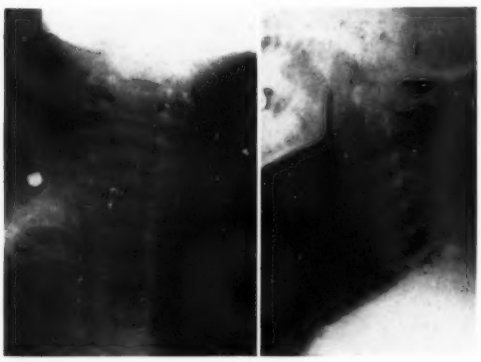

Fig. 6. a, Wounds and treatment in Case 6. b, Extreme displacement of trachea. Injury to common carotid and vertebral artery.

Fig. 6b.

There was no injury to the jugular vein in this case. No effort was made to isolate or ligate this structure. The matter of concomitant vein ligation when a large artery is severed as is frequently practiced in arterial wounds of the extremities needs further inquiry. In the immediate postoperative period for almost three weeks the patient showed no changes that would suggest a better result following vein ligation.

CASE 5. Lt. R., aged 23 years, was injured at 11:00 a.m. February 28, 1944, when high explosive shell fragments penetrated his neck. He was taken to an advanced dressing station (Brit.) where it was found that he was pulseless, moribund, cyanotic, and cold. He was given immediately 1500 cubic centimeters of blood and ¼ grain morphine (?) intravenously. Through the open wound hemorrhage was controlled by ligatures and sutures. He responded well and at 1:30 p.m. his pulse was 80 and he appeared to be in good condition except for some bloody expectoration. He was evacuated and arrived at the hospital at 4:30 p.m., February 28, 1944. On admission his condition was satisfactory: temperature 98.6, pulse, 80, respiration, 20; blood pressure 120/82. There was a swelling on the right side of the neck and in the right supraclavicular fossa. In the center of the anterior surface of the neck there was a large defect in the skin measuring approximately 2 inches in diameter. Much blood oozed from the wound and no pulse was obtained in the right temporal artery. An x-ray study showed many small and one large metallic fragments in the soft tissues of the neck. At 6:30 p.m. under nitrous oxide-oxygen-ether anesthesia he was intubated with some difficulty because of considerable edema about the glottis. Wound excision was done. Zipper fragments, cloth, and dirt were removed and a large portion of the right lobe of the thyroid gland was resected. The severed external and anterior jugular veins were ligated, the superior and inferior thyroid arteries were ligated, and the right common carotid artery was ligated proximal and distal to a large irregular opening in its wall. The right supraclavicular fossa was exposed, a hematoma evacuated, and small bleeding vessels were ligated.

During the operative procedure the blood pressure readings varied considerably. At one time the systolic pressure was 280, diastolic 110. Following surgery his blood pressure was 120/50, pulse, 108, and respiration, 22. He was given 500 cubic centimeters of blood during the course of surgery. He did not awaken until 5:00 p.m. of the following day. During this period his pulse and respiration did not vary much but his blood pressure slowly rose to 140/80. At this time it was noted that there was a left-sided

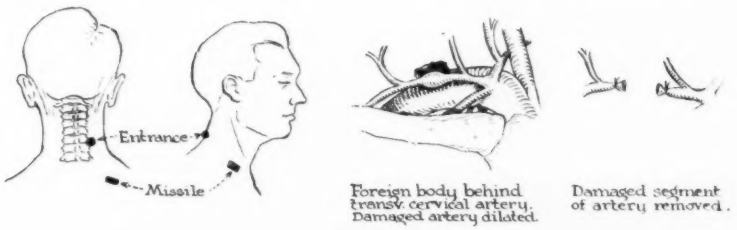
Entrance
Missile
Foreign body behind transv. cervical artery. Damaged artery dilated.
Damaged segment of artery removed.

Fig. 7a.

Fig. 7. a, Wounds and treatment in Case 7. b, Injury to transverse cervical artery.

Fig. 7b.

hemiplegia. Vomiting occurred at noon. February 29 and the patient showed marked drowsiness and difficulty in swallowing. At 4:00 p.m. he became comatose and showed marked spasms of both sides of the body. During the next 4 hours his blood pressure ranged between 185 and 210 systolic and between 0 and 90 diastolic. He never regained consciousness from this point on. A lumbar puncture gave a clear, colorless fluid containing 2 white blood cells per cubic millimeter. The spinal pressure was 310 millimeters. Following the puncture there was a slight drop in the pulse and blood pressure but at midnight February 29 the pulse rose to 136, respiration, 24, blood pressure 152/90. He failed rapidly and expired at 1:00 a.m., March 1, 1944.

Autopsy (extract of report by Dr. Leo Kaplan): "There is found an extensive hemorrhage extending along all the fascial planes on the right side of the neck posteriorly to include the muscles of the posterior triangle of the neck; superiorly to the base of the skull along the right sternomastoid and retropharyngeal space and inferiorly behind the esophagus into the entire posterior mediastinum to the diaphragm. There is no local accumulation of blood and there is no evidence of any recent bleeding. A small segment of the posterior aspect of the right lobe of the thyroid is found containing multiple sutures and separated from the isthmus of the thyroid by a defect. The superior and inferior thyroid arteries have been ligated. Two distinct sutures are found about the right common carotid artery in the inferior aspect of the neck. There is a 6.0 centimeter defect between this point and that of the distal segment of the same artery where a silk ligature is found placed about the vessel. The vessel has retracted into the carotid sheath.

"Within the proximal segment of the right common carotid artery is found a propagating thrombus which extends inferiorly for a distance of 4.5 centimeters. Within the distal end of this vessel is another small nonadherent thrombus which measures 1.0 centimeter in length.

"Dissection of the larynx shows a small perforation with margins that fall against each other. This wound passes through the substance of the cricoid cartilage in its right half and opens into the larynx. The thyroid cartilage above this point is lineally fractured. The submucosal tissues about this fracture and perforation site are edematous and filled with organizing hemorrhages as far superiorly as the true vocal chord. The mucosa surrounding the puncture site is coated by a fibrinous membrane.

"The dural sinuses are everywhere patent. The dura especially over the convexities is slightly adherent to the pia-arachnoid by very fine white fibrous strands which separate with slight difficulty. There is no evidence of any subarachnoid bleeding. Both cerebral hemispheres are swollen and exhibit gyral flattening, but the left hemisphere is distinctly larger then the right. Dissection of the great vessels

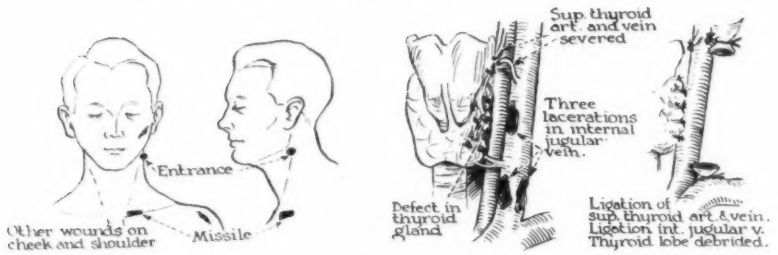
Entrance
Other wounds on cheek and shoulder
Missile
Sup. thyroid art. and vein severed
Three lacerations in internal jugular vein.
Defect in thyroid gland
Ligation of sup. thyroid art. & vein.
Ligation int. jugular v.
Thyroid lobe debrided.

Fig. 8a.

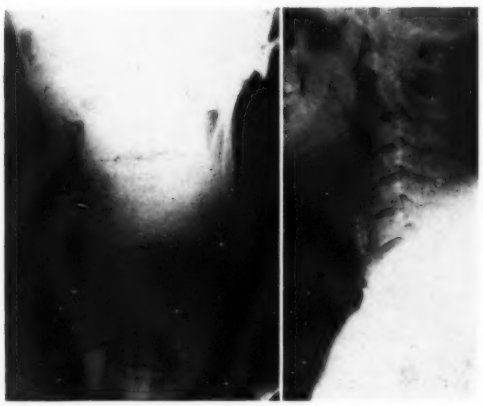

Fig. 8b.

Fig. 8, a. Wounds and treatment in Case 8. b, Large foreign body with slight tracheal displacement. Injury to superior thyroid artery veins, extensive injury to internal jugular vein.

of the brain shows an intact circle of Willis, internal carotid artery, basilar and vertebral arteries. A dissection of the right middle cerebral artery reveals a complete thrombosis beginning at a point 2.0 centimeters from its point of entrance into the Sylvian fissure. From here on the branches of the middle cerebral exhibit a staghorn type of thrombosis. There is an extensive softening of the right cerebral hemisphere most marked in its midportion and especially in the region of the basal ganglia. The right lateral ventrical is somewhat narrowed as compared with the left. The left cerebral hemisphere is edematous and slightly hyperemic. Serial section of the midbrain, pons, and medulla show the former two to be the seat of extensive discreet and focal hemorrhages and areas of softening which are most prominent on the left side and in the periaqueductal region. The left superior cerebellar artery in some of its smaller branches which extend into the brachium pontis are thrombosed and encased in a small fusiform hematoma (etiology?). The medulla and the cerebellar hemispheres are edematous."

This patient sustained a severe injury to the neck involving many small vessels in addition to the right common carotid artery. Embolism and thrombosis played a rôle in the changes which were fatal. The alterations in blood pressure and cerebral edema developing during surgery may indicate that manipulation soon after the first and second efforts in controlling hemorrhage may have been a factor in liberating emboli. The case study emphasizes the importance of the development of thrombi in traumatized vessels more especially when the blood flow through the vessel is impaired by a prolonged drop in blood pressure. The blood pressure phenomenon which developed at the time of surgery would indicate that cerebral changes of a serious nature had already occurred.

In the immediate care at the casualty station the value of a large amount of blood administered to replace a blood loss is illustrated. An important point for discussion concerns the advisability of occluding the wound until complete initial surgery can be undertaken.

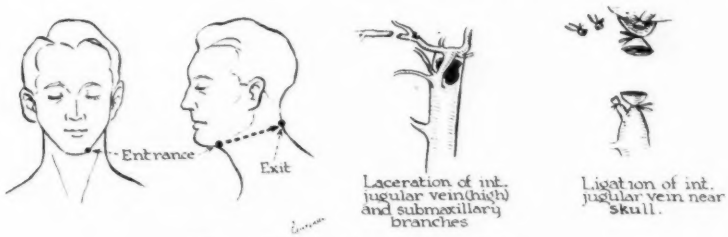

Fig. 9. Wound and treatment in Case 9.

The grasping of bleeding vessels in a dirty wound with the placing of ligature and sutures may be a predisposing factor to thrombosis and early embolism. A desperate situation frequently requires what appear to be desperate means to preserve life. Since such desperate action may in itself preclude ultimate recovery it would appear desirable to consider all of the possibilities to control bleeding until the patient can be transported to a hospital where necessary initial surgery may be undertaken. Packing as a temporary measure may be more desirable than sutures and ligatures in a contaminated field.

CASE 6. B.M., aged 10 years, found a fountain pen "booby trap" near Anzio. On manipulation it exploded and a metal fragment penetrated the right side of his neck. He was taken to an aid station at 6:30 p.m. June 7, 1944 and evacuated to the hospital at 8:00 p.m. He was dyspneic, had a small wound in the midline at the level of the cricoid cartilage and a swelling on the right side of the neck. An x-ray study showed marked deviation of the trachea to the left with a foreign body at the level of the 7th cervical vertebra. There was considerable oozing of blood from the external wound. At 10:00 p.m. under ether anesthesia administered through an endotracheal tube, an incision was made along the anterior border of the right sternomastoid muscle. The common carotid artery was exposed and provisionally controlled. This, however, did not control hemorrhage from the wound but pressure over the subclavian deep in the wound permitted exploration in a dry field. It was found that the single metal fragment had severed the right vertebral artery at a site proximal to its entrance into the vertebral foramen and in addition lacerated irregularly the right common carotid artery. The nature and extent of the laceration in the carotid did not warrant suture. Ligations of both vessels proximal and distal to the site of injury were done. The damaged portion of the carotid was excised. The wound was loosely closed. He was given 500 cubic centimeters of blood during surgery. The postoperative course was uneventful during the 5 days of observation. There were no mental, cerebral, or peripheral nervous system changes. He was out of bed on the fourth day, talked with his parents and ate his meals without difficulty. Because of the tactical situation he was evacuated to the rear and observation beyond the 5th postoperative day was not possible.

It would be desirable to have had more detailed follow-up data in this case. The injury to two of the four vessels which carry blood to the brain did not appear to have had an unfavorable effect on this youngster during the time of observation. The internal jugular vein was not injured and was not occluded.

CASE 7. Sgt. H., aged 25 was injured October 13, 1944, 7:30 p.m. by a shell fragment which penetrated the right side of the neck posteriorly and lodged in the right supraclavicular fossa. He was admitted to the hospital at 2:10 a.m. October 14. Swelling and tenderness were present on the right side of the neck with oozing of blood from the irregular wound over the right trapezius muscle. A supraclavicular incision exposed the tract of the missile. The foreign body was lodged against the damaged transverse cervical artery which had an aneurysmal dilatation at the site where it passes between the cords of the brachial plexus (Fig. 7). All bleeding vessels were ligated, damaged tissue was removed, and the wound was left open. No unusual symptoms were present or developed in the immediate postoperative period and he was evacuated to the base hospital on October 19, 1944.

This type of trauma illustrates vessel injury without penetration, perforation, or severance. It is likely that many injuries similar to this occur unassociated with immediate hemorrhage. Some are followed by hemorrhage when sloughing or perforation of the damaged vessel occurs. Others develop aneurysms which require ablation at a later day.

CASE 8. Lt. M., Italian soldier, aged 25 years, sustained shell fragment wounds of his face, neck, and shoulders at noon October 28, 1944, and was admitted to the hospital at 7:45 p.m. of the same day.

On admission he was in a state of shock and blood pressure when obtainable was 80/20. He improved following 500 cubic centimeters of whole blood. There was a small laceration of the face, a few wounds of the left shoulder, and a lacerating wound of the left side of the neck 2 inches long at the level of the larynx. A large irregular foreign body was disclosed in the left supraclavicular fossa at the site of a swelling. Under nitrous oxide-oxygen-ether anesthesia the left side of the neck was explored through an incision along the anterior border of the sternomastoid muscle. The superior thyroid artery and vein were severed, and a defect was present in the superior pole of the left lobe of the thyroid. The internal jugular vein was extensively lacerated over a considerable distance. Hemorrhage was controlled by the positioning of "stick sponges" at sites proximal and distal to the bleeding vessel. All bleeding points were ligated. The internal jugular vein was ligated high and low and all damaged tissue with the foreign body was removed from the wound. Loose closure of the wound was done. No unusual changes developed and he was evacuated on November 8, 1944 in good condition.

Bleeding from a large vein is at times more troublesome than bleeding from a large artery. Extreme care must be exercised to prevent tearing of the vessel when efforts are made to control bleeding. Gentle compression over the wound and careful dissection with instruments that are smooth aid considerably in placing ligatures properly.

CASE 9. Pvt. F., aged 19 years, was injured July 8, 1944 by a shell fragment which perforated the neck. The entrance wound was on the left side at the level of the chin and the exit was on the same side below the mastoid process. There was some swelling in the anterior triangle of the neck but no tenseness and little pain. Some difficulty in breathing was experienced. Examination showed the larynx, glottis, left tonsil, and posterior pharynx edematous. Intratracheal intubation was accomplished under nitrous oxide-oxygen-ether anesthesia. Through an incision parallel to and below the inferior margin of the mandible the tract of the missile was exposed. The internal jugular vein was completely transected as were the venous tributaries from the submaxillary gland. The missile passed posterior to the carotid artery without injury to this vessel. All bleeding points were ligated, but control of bleeding from the cephalic end of the jugular vein was difficult because of retraction of the vessel. By the use of a silk suture applied to the bleeding site with fixation in the adjacent sternomastoid muscle, it was possible to control the bleeding without damage to adjacent structures. Recovery was uneventful and the patient was evacuated to the base hospital on July 17, 1944.

In this particular case as well as in several others where the source of the bleeding is a large vein, it is of the utmost importance to refrain from using forceps to control bleeding points. Veins have thin walls, tear easily, and have a tendency to permit blood to "well up" into the wound. The use of "stick sponges" to block out the zone of bleeding with a systematic approach to the site of bleeding for careful isolation of the vessel before ligation or suture is done are most helpful in the control of hemorrhage.

In some cases it is found that ligation of the internal jugular vein permits a sac filled with blood extending from the ligated cardiac end to the next distal tributary. It is desirable to ligate the vein adjacent to the nearest tributary to prevent this blind sac from existing. In wounds that are contaminated from penetrating and perforating foreign bodies, the dangers of thrombosis, phlebitis, and sepsis warrant the removal of all stagnant accumulations of blood.

RÉSUMÉ

This series of vascular injuries in the neck does not represent all the patients with vascular injuries admitted to this hospital. However, the cases not recorded here represent for the most part injuries to the external, anterior and internal jugular veins and such smaller vessels which were available in the wound without extensive loss of blood or hematoma formation. The one death in this series is recorded in some detail (Case 5).

From a review of these cases it appears that the following general comments are warranted.

1. Vascular injuries in the neck are not common but are serious and may be fatal.

2. Blood for replacement of that lost either before or during surgery must be available, at hand and ready for use.

3. Anesthesia must afford a high oxygen intake. A competent anesthetist familiar with the necessary techniques and conscious of the special needs of the patient with this type of injury is a valuable asset. Local anesthesia for an elective procedure may be desirable to avoid anoxia that may be associated with general anesthesia. However, a recently injured patient in full knowledge of his injury especially when some dyspnea is present is very anxious to be put to sleep. In addition,

where the exposed wound is obscured by blood and damaged tissue, complete anesthesia with novocain may not be possible. A seriously wounded patient should not be subjected to physical or mental pain with incomplete anesthesia. Also, a struggling patient cannot co-operate and a bleeding neck wound requires a deliberate and careful approach to prevent adding to the damage done by the missile. It is noteworthy that almost all of the patients with neck wounds done at the hospital were awake immediately after surgery was completed following nitrous oxide-oxygen-ether anesthesia which was administered by a competent anesthetist using the endotracheal technique.

4. Ligations of vessels should be done at sites free from trauma and adjacent to branches or tributaries to prevent thrombosis in the "blind segment."

5. It is noteworthy that in those patients who sustained wounds of the neck involving blood vessels, injury to the larynx, trachea, pharynx or esophagus or both, were rare (Case 5—trachea and larynx, Case 2—trachea). In another series of 10 patients who sustained injuries involving the larynx, pharynx, or esophagus, or both, there were no large vessel injuries.

6. Ligation of the carotid artery soon after trauma is usually not followed by mental, cerebral or peripheral changes in the age group noted in this series. It is obvious that occlusion of the common carotid or the internal carotid results in a marked diminution in the blood supply to the brain. It is difficult to explain why in some patients this brain anemia is temporary and not destructive of the functions of the brain while in others changes of great severity rapidly ensue. Many theories have been offered but there is probably no one which will satisfactorily explain the phenomenon in every case.

The dangers associated with ligation of this important vessel warrant the use of reconstructive methods and anticoagulants.

7. Venous bleeding in the neck is best controlled by careful isolation of the damaged vessel, ligation of the bleeding point, or when necessary, suture of the bleeding site.

8. While the prevention and control of infection was based on the surgical principle of decompression of fascial spaces by incision, all of the patients were given sulfadiazine or penicillin. The former was given routinely in 5 gram doses daily for 5 to 7 days to patients admitted prior to May, 1944. The latter was given in 25,000 unit doses intramuscularly every 3 hours for 5 days subsequent to May, 1944. The rôle these agents played in the prevention or the control of infection in these patients was the same as in other patients with wounds elsewhere on the body.

SUMMARY

In patients requiring immediate control of bleeding from a large vessel in the neck, adequate blood replacement before and during surgery is necessary. An anesthetic offering a high oxygen content with free passage of oxygen into the lungs is imperative. Thoughtful planning for provisional control of bleeding from an injured vessel will avoid unnecessary loss of blood. Excision of damaged tissue will prevent to some degree thrombosis and embolism. Cleansing of the contaminated wound and the use of penicillin helps to avoid infection and its sequels.

IMPROVEMENT IN ABDOMINAL HYSTERECTOMY MORTALITY

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IN a previous report from Harper Hospital[1] we published the death rate for abdominal hysterectomy (excluding pelvic malignancy, hysterectomy after cesarean section and for obstetrical emergencies such as ruptured uterus) during the 5 years 1928-1932, inclusive. Mortality rates for total and subtotal hysterectomy were respectively 6.4 and 2.6 per cent. In view of the changes in pelvic surgery and the general improvement of surgical mortality in all fields in recent years, we undertook a similar study of results for the 5 years 1941 to 1945. Comparing the mortality rates, and excluding, as before, all hysterectomies for pelvic malignancy and obstetrical emergencies, a striking difference was at once apparent:

	1928–1932			1941–1945		
	Cases	Deaths	%	Cases	Deaths	%
Subtotal hysterectomies	1141	30	2.6	1413	7	0.50
Total hysterectomies	235 (17%)	15	6.4	935 (40%)	6	0.64
All cases	1376	45	3.2	2348	13	0.55

The dramatic improvements for all groups shown in this comparison of results, as well as the near equality of mortality rates for total and subtotal hysterectomies in the latter 5 years, prompted us to undertake a study of all abdominal hysterectomies performed at Harper Hospital for the entire period 1928 to 1945, inclusive. Thus there would be not only a comparison of two 5 year series from different periods, but also a record of the transition years between. It was thought that such investigation would better determine the factors responsible for the improved results now obtained and could lead to valuable suggestions for further betterment. In order to present the complete picture, we decided to include consideration of *all* abdominal hysterectomies; i.e. those done for pelvic malignancy and obstetrical complications as well as the benign conditions. Actually, however, this changed the mortality figures only slightly and simplified calculations. This inclusion, moreover, now permits comparison of results with series from other institutions.

From Harper Hospital and Wayne University College of Medicine.

Presented at the November 12, 1946 meeting of the Michigan Society of Obstetricians and Gynecologists.

[1] R. S. Siddall and H. C. Mack. Surg., Gyn. Obst., 1935, 60: 102.

ABDOMINAL HYSTERECTOMIES, 1928-1945

The complete series comprises 6,692 abdominal hysterectomies of which 2,050 (30.7 per cent) were total hysterectomies. These operations were performed by approximately 100 gynecologists, surgeons, occasional operators and residents in training, representing varying degrees of skill and experience.[2] The women operated upon were, in the vast majority, private patients. The operations contained examples of virtually every known technical variation in the performance of abdominal hysterectomy. The differences in technique, however, were not sufficiently clear-cut to permit classification and comparison of methods during this period.

Incidence of hysterectomies (Fig. 1) shows the numbers of abdominal hysterectomies performed each year from 1928 to 1945, as well as the numbers of complete and subtotal operations compared to the yearly totals. The increasing employment of hysterectomy during the 18 year span, in spite of no increase in hospital beds or appreciable additions to the staff, suggests a growing tendency to substitute ab-

[2] In our first publication the importance of experience of the operator, as judged by the numbers of hysterectomies performed, was clearly demonstrated. However, since the last 5 years of this series fell within the war years with consequent absence of many of the staff of all age groups for variable periods, any estimate on the basis of operations performed would obviously be of questionable value, particularly when compared to the original series. Consequently, this method of calculation was not attempted in the present study.

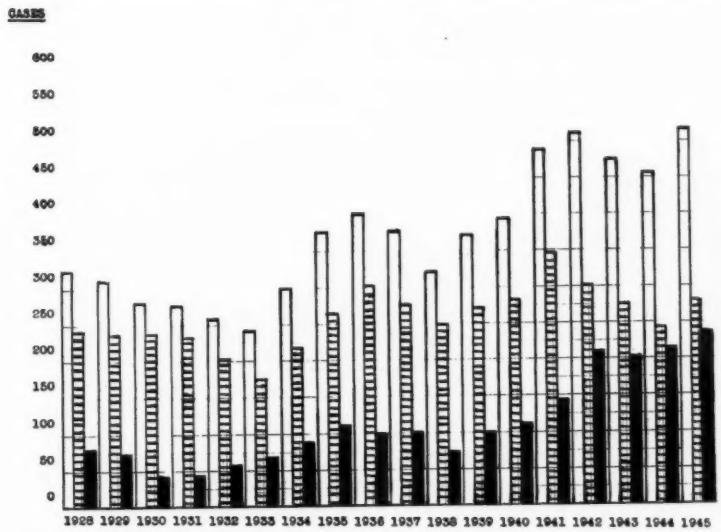

Fig. 1. Incidence of hysterectomies. White columns, all abdominal hysterectomies; crosshatched areas, supravaginal hysterectomies; black areas, panhysterectomies.

dominal hysterectomy for other gynecologic procedures.

In addition to the increased election of abdominal hysterectomy, there is evident also a steady growth in selection of the total operation. Whereas, in 1928-1932 only 20.7 per cent of all abdominal hysterectomies were of the complete variety, the 5 years 1941-1945 showed that this proportion had doubled (41 per cent). It is noteworthy that this increase in the choice of panhysterectomy occurred in spite of the virtual abandonment of radical hysterectomy for carcinoma of the cervix in favor of radium and roentgen-ray therapy in recent years. In view of this curtailment, the selection of the total operation has obviously been extended for other indications.

Mortality. Among the 6,692 abdominal hysterectomies there were 119 deaths. An analysis of the mortality for the various groups as given in Table I shows a remarkable decrease in the death rate, from 3.7 per cent in the years 1928-1932 down to 0.78 per cent in the 1941-1945 period, with the intervening years, 1933-1940, at 1.65 per cent. Expressed differently: The risk in each of the last two periods was less than one-half that of the previous one. Moreover, this dramatic improvement has occurred with both the total and subtotal operations.

TABLE I.—COMPARISON OF MORTALITIES FOR THE THREE PERIODS AND FOR SUPRAVAGINAL AND PANHYSTERECTOMY

	1928–1932			1933–1940			1941–1945		
	Cases	Deaths	Per cent	Cases	Deaths	Per cent	Cases	Deaths	Per cent
All cases	1456	54	3.7	2785	46	1.65	2451	19	0.78
Subtotal hysterectomy	1155	32	2.8	2036	33	1.62	1447	11	0.76
Total hysterectomy	301	22	7.3	749	13	1.73	1004	8	0.80

The most striking feature of Table I is the improvement in panhysterectomy mortality. While the risk of the subtotal operation has been reduced very substantially down to a figure between one-third and one-fourth, the total hysterectomy mortality in the last group was only one-ninth of that of the first 5 years. This means that total hysterectomy, which was more than two and one-half times as dangerous as supravaginal in the first 5 years, reached near equality in the last two periods. The mortality percentage for the two types of operation by years is shown in Figure 2. It is

noteworthy that in the years 1941 and 1942 there were 352 consecutive panhysterectomies without fatality.

The approach to parity in mortality of the two types of hysterectomy would seem to invalidate the conclusion in our first report that, in view of the greater risk at that time, total hysterectomy was not justified *routinely* as a prophylactic procedure against carcinoma of the cervix. Certainly, the tremendous improvement in results now permits a very welcome extension in the use of the complete operation. Nevertheless, there are several reasons to believe that the mortality figures of the two operations are not altogether comparable and consequently do not give the true picture regarding the relative operative dangers. This is evident from the fact that, in accord with prudent surgical judgment, the poorer risk patients tend to have the less formidable operation, except in the rather few instances where panhysterectomy is absolutely imperative. It is interesting to note that this selection of poor risk patients for supravaginal hysterectomy seemed to apply to instances of malignancy as well as to benign conditions. For example, in 1941-1945, the two patients with malignancy who died after panhysterectomy were without question in excellent condition in one case and a fairly good risk in the other. In contrast, of the three fatalities after subtotal hysterectomy during this same period, one was 74 years old with marked anemia, renal insufficiency, and peritonitis; another had marked anemia, evidence of intestinal obstruction due to widespread peritoneal implants from ovarian carcinoma, and weighed 260 pounds; and the third died of peritonitis following perforation of the bowel while the pelvic organs were being freed of adhesions. This third case is an example of the fact that it is also fairly common practice to change preoperative plans for total hysterectomy to subtotal removal because of operative accidents, unexpected technical difficulties, or the necessity for speedy conclusion of the operation. Obviously, in these circumstances an inadvisable persistence in carrying out the more extensive operation would without fail substantially increase the mortality rate. More prudent selection of cases must have played an important part in the reduced mortality of panhysterectomy in our later series.

Causes of death. To determine the causes of death in the 119 fatalities in this series was probably the most difficult portion of the study. Incomplete records as well as inadequate clinical and laboratory data were prominent shortcomings, especially in the earlier cases. In the absence of adequate blood studies and blood pressure records, it was frequently necessary to glean the criteria for the probable diagnosis from data given in the nursing notes, often more informative than progress notes of the attending and resident staff. Where ample information was available, the data were at times contradictory and often there were confusing multiple contributory causes. Even in a few cases with complete postmortem examination, considerable doubt as to the primary cause of death existed. Table II summarizes our best estimate of the causes of death.

TABLE II.—CAUSES OF DEATH

	Entire series		1928–1932		1933–1940		1941–1945	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
All causes	119		54		46		19	
Peritonitis (infection)	64	53	35	64	23	50	6	31
Hemorrhage (shock, cardiac)	27	23	8	15	14	30	5	26
Embolus	14	12	9	17	1	2	4	21
Pneumonia	7	6	1	2	5	11	1	5
Apoplexy	3		0		2		1	
Diabetic coma	2		1		0		1	
Uremia	1		0		0		1	
Meningitis	1		0		1		0	
Associated carcinoma	21	18	11	13	5	11	5	26

From Table II it is immediately apparent that infection, hemorrhage with shock and cardiac failure, and embolus play the principal rôles in the entire series. The interchange of the last cause with pneumonia in the second period is probably only incidental to the small numbers involved. In assigning the principal causes of death after review of the case records, the combination of anemia (preoperative or resulting from operative blood loss) and in-

fection (peritonitis, ileus) in the same patient frequently made it difficult for us to determine which factor was primary. Similarly, many instances of probable surgical shock with early fatal outcome had originally been catalogued as "myocardial failure." Acknowledging valid objections to including deaths from shock and hemorrhage with those of cardiac failure, we have continued this grouping (as in our first publication) to facilitate comparison between the groups, and also because of the difficulties of differentiating between these conditions through lack of adequate clinical and laboratory data. Regardless of the acknowledged shortcomings of such *ex post facto* deductions, it is possible to ascertain certain trends in the preoperative and postoperative care of these cases which may explain some of the improvements attained.

In Table III are given the causes of death with subtotal and total hysterectomy for the 5 year periods 1928-1932 and 1941-1945. The figures demonstrate marked improvement for both types of operation. They also show again that in spite of this improvement, the same causes of death are important now as before.

TABLE III.—CAUSES OF DEATH WITH SUBTOTAL AND TOTAL HYSTERECTOMY

	All cases		Subtotal hysterectomies		Total hysterectomies	
	1928–1932 (1456)	1941–1945 (2451)	1928–1932 (1155)	1941–1945 (1447)	1928–1932 (301)	1941–1945 (1004)
Peritonitis (infection)	35	6	18	5	17	1
Embolus	9	4	6	1	3	3
Hemorrhage (shock, etc)	8	5	6	2	2	3
Pneumonia	1	1	1	0	0	1
Apoplexy	0	1	0	1	0	0
Diabetes	1	1	1	1	0	0
Uremia	0	1	0	1	0	0
All causes	54	19	32	11	22	8

ANALYSIS OF CAUSES OF DEATH

Gratifying as it is to report the great improvement in the mortality results for hysterectomy at Harper Hospital, the most important function of this study is an inquiry into measures for further betterment. Most promising for that purpose appeared to be further analysis of the major causes of death to discover improvements in treatment which could have been responsible for the lowered mortality of the later periods. It was hoped that in this way leads to further improvement might become evident.

Infection. As is shown in Table II, postoperative peritonitis was numerically and proportionately the greatest contributing factor to mortality in the entire series and in each of the three time intervals. Of all patients subjected to hysterectomy during the 18 year period, 0.95 per cent died as a consequence of infection. It was the cause of death in 0.75 per cent of supravaginal and 1.4 per cent of panhysterectomy operations. A dramatic contrast, however, is evident when we calculate the incidence of fatal peritonitis in the three periods represented in this series: in 1928-1932 it was 2.4 per cent; in 1933-1940 it declined to 0.82 per cent; and in 1941-1945 it reached the low figure of only 0.24 per cent. In other words, the risk of death from peritonitis in the last 5 year span was only one-tenth that of the first series. A similar decline was noted when the death rate for peritonitis was calculated according to type of operation performed: for supravaginal hysterectomy the rates per cent were 1.5, 0.58, and 0.34, respectively for the three time groupings; and for panhysterectomy the results were 5.6, 1.4, and 0.1 per cent, respectively.

In attempting to explain this striking lowering of the death rate from infection, several potential factors were considered: (1) incidence of malignancy, (2) incidence of acute salpingitis, (3) preoperative and postoperative treatment of anemia, (4) chemotherapy.

Malignancy. The frequent sequel to pelvic surgery for malignancy, namely, peritonitis, has long been recognized. The fact, however, that death from infection has diminished despite a proportional increase in deaths associated with malignancy (Table II), would make it seem likely that some factor other than a lowered incidence of malignancy in recent years accounts for the declining death rate from infection.

Salpingitis. A partial explanation for some lowering of the death rate from infection is found in the declining frequency of operations

for "pus tubes." Among the 64 peritonitis (infection) deaths in this series, there were 9 with pathological evidence of acute or subacute salpingitis. It seems significant that 7 of these deaths occurred in the 5 years 1928-1932; 2 were recorded in 1933-1940, and none such were noted in 1941-1945. These figures suggest that selection of patients with respect to preoperative pelvic infection contributed to a lowering in the infection death rate. The fact, however, that infection was fatal only one-sixth as often in 1941-1945 as in 1928-1932 makes it likely that other factors were also responsible.

Preoperative and postoperative treatment of anemia. In an attempt to determine the effect of preoperative and postoperative treatment of blood loss upon the mortality of hysterectomy, we have investigated the incidence of blood transfusions among all patients subjected to hysterectomy. We have also calculated the frequency of transfusion among those who died following hysterectomy on the assumption that this might give a clue as to the energy with which these serious cases were treated. Grouped in 2 year periods, these relationships are shown in Table IV.

TABLE IV.—RELATIONSHIPS OF HYSTERECTOMY MORTALITY TO FREQUENCY OF PREOPERATIVE AND POSTOPERATIVE BLOOD TRANSFUSIONS

Years	No.	Deaths		Infection deaths		Hysterectomies transfused		Hysterectomy deaths transfused	
		No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
1928–29	637	30	4.7	23	3.6	7	1.0	1	3.3
1930–31	559	18	3.2	9	1.6	15	2.6	3	16.6
1932–33	503	12	2.3	6	1.2	14	2.7	5	41.6
1934–35	677	13	1.9	5	0.73	11	1.6	1	7.6
1936–37	779	9	1.1	5	0.64	27	3.5	2	22.2
1938–39	693	13	1.8	8	1.15	67	9.6	9	69.2
1940–41	882	8	0.9	4	0.45	102	11.5	6	75
1942–43	989	7	0.7	3	0.30	102	10.3	4	57.1
1944–45	973	9	0.9	1	0.10	not indexed		3	33.3

It seems evident from Table IV that the decline in general mortality and in death from infection bears a relationship to, or at least parallels, the increasing use of preoperative and postoperative blood transfusions. Not only was this measure employed more frequently in all cases, but also its increasing use in the critically ill who subsequently died indicates more energetic treatment with this accepted measure against the two closely related complications of blood loss and infection. It seems more than a coincidence to relate the lowest mortality rates to the years with the highest incidence of blood transfusion.

As a matter of historical interest, at Harper Hospital, blood transfusions in the early years were performed by the technically difficult direct method of blood transfusion. The introduction of the simple vacoliter method of indirect transfusion relegated the direct transfusion technique to virtual disuse since 1937. The blood bank was established in 1938. The impetus given to blood transfusions by the simplified indirect method and the blood bank is shown in the increased incidence of transfusion since 1937 and 1938. It seems reasonable to us that the increasing use of transfusion has been the largest single factor in the reduction of hysterectomy mortality in our series. The fact that a steadily increasing proportion of patients who died following hysterectomy were transfused is indicative of more intensive and efficient postoperative care and the recognition of the importance of blood loss as a contributing factor in many postoperative complications other than massive hemorrhage. It is heartbreaking to read the case histories of early fatalities which might have been avoided by this means. It is difficult to explain, also, why blood transfusion was not more energetically employed in a certain number of even recent deaths. Since 1943, blood transfusions have become such a commonplace feature of hospital practice that they are no longer crossindexed in the hospital record room; hence figures for transfusion in hysterectomy are not available for 1944-1945.

Chemotherapy. To evaluate the effect of chemotherapy and antibiotics would require a separate study of each of the 3,537 cases of hysterectomy since 1938 when sulfa therapy was first attempted in one of the patients who died from peritonitis after removal of the uterus. From 1938 to 1945, sulfa therapy was em-

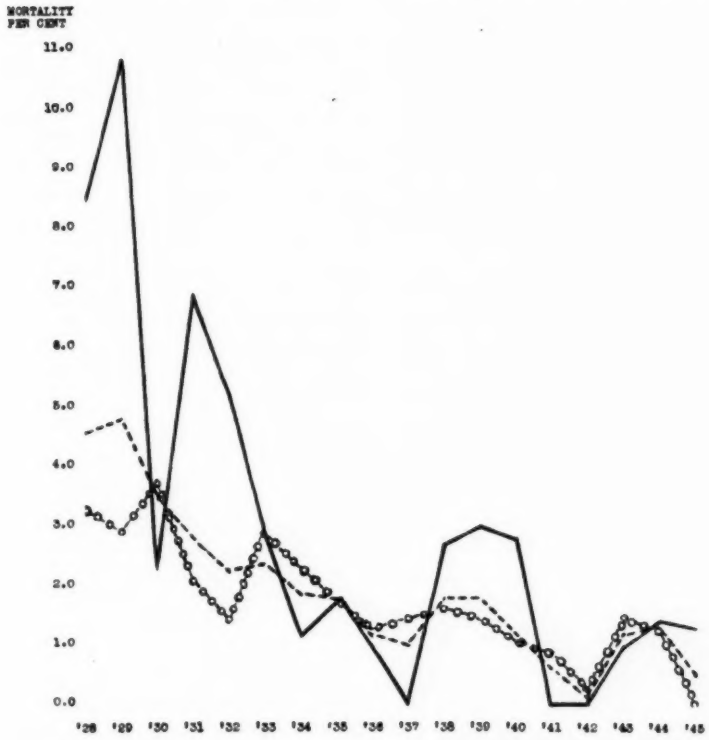

Fig. 2. Mortality percentages. – – – –, all abdominal hysterectomies; o-o-o-o supravaginal hysterectomies; —— panhysterectomies.

ployed in 15 of the 37 patients who died during that period, 16 deaths during this time being ascribed to peritonitis. In a large proportion of these deaths, particularly in the early years, dosage was entirely inadequate as judged by present standards. Most often it was not only too little but also too late. To judge properly the effectiveness of chemotherapy would require an analysis of all morbid cases, comparing the results of those treated and not treated by sulfonamides or antibiotics. This method of therapy is not crossindexed in our record room and hence this valuable part of the study was not undertaken. Suffice it to say that, despite its obvious benefits, other factors in the selection of patients and in preoperative and postoperative care had already lowered considerably the death rate before the beginnings of chemotherapy after 1938 (Fig. 2).

Hemorrhage. Deaths related to hemorrhage, shock, and myocardial failure (acknowledging again the questionable justification for including the last, as explained above) accounted for 27 deaths or 0.40 per cent of all hysterectomies. While shock and cardiovascular collapse as a sequence to bleeding still occupy a prominent place among the causes of death listed in Table III, the frequency of this complication shows a demonstrable decline during the succeeding time periods of this series: in 1928-1932 it was 0.54 per cent; 1933-1940, 0.50 per cent; 1941-1945, 0.20 per cent. This improvement again can probably be explained by the increasing resort to blood transfusion, notably since 1936, as shown in Table IV.

Embolism. Postoperative embolism accounts for the third major cause of death in this series, occurring in 0.20 per cent of all hys-

terectomies. A decline in the rate of 0.61 per cent in 1928-1932 to 0.16 per cent in 1941-1945 is undoubtedly significant though the numbers are too small to admit statistical evaluation. The extremely low incidence in 1933-1940 could not be explained and is probably a coincidence. The relationship of embolism to infection often suggests the possibility that our improved results may be traced to a lowering of the incidence of infection.

SUGGESTIONS FOR FURTHER IMPROVEMENT

In addition to the suggestions contained in the foregoing analysis of the causes of death, there appear to be several other possibilities for further improvement which should be examined; namely, anesthesia, substitution of vaginal for abdominal hysterectomy, and faults in operative technique. And, finally it seemed pertinent to us to review the deaths during the 1941-1945 period in an effort to determine in specific cases the possibility of further reduction of mortality in the light of accumulated information.

Anesthesia. By far the majority of operations in this series were performed under spinal or nitrous oxide-oxygen-ether anesthesia. Other methods previously known (except chloroform) and newer developments during the years covered were also employed. Two cases of so called "ether convulsions" in 1939 later resulted fatally in definitely established pneumonia. Since the exact pathogenesis of this complication is still disputed, it is questionable whether or not these deaths should be attributed to the anesthetic agent. There were several instances of postoperative shock and "myocardial failure" following spinal anesthesia where there was some suspicion that oversedation preoperatively might have contributed to the fatal outcome. It is certainly possible or even highly probable that anesthetic factors may have contributed in several instances to deaths from pneumonia, though the connection could not be satisfactorily established. In general, then, all we can say is that anesthesia was probably responsible in some part for several deaths, but how important a factor it actually was and in what way matters could be improved were not revealed by our study.

Vaginal hysterectomy. In several recent reports, vaginal hysterectomy has been advanced as safer than the abdominal operation. In view of the results reported here for a large group of operators of varying skill and experience, this assumption could be seriously questioned. Moreover, the advantage of the abdominal incision in permitting careful examination of all pelvic and abdominal organs, with treatment if necessary, is a point decidedly in favor of abdominal hysterectomy. Disregarding, however, the discussion pro and con as to the advantages of vaginal hysterectomy (or even granting for the sake of argument a greater safety for vaginal approach), we investigated the deaths in this series to determine if substitution of the vaginal technique might have been life-saving. We found that in 16 of the 19 fatalities of the 1941-1945 series, vaginal operation would have been impossible, difficult to the point of grave danger, or would not have accomplished the desired result. Conditions present in these 16 cases were as follows: large fibroids, 2; fibroids of varying size with dense and extensive adhesions from pelvic inflammatory disease or endometriosis, 7; carcinoma of the ovary, 3; endometrial carcinoma, 2; cystadenoma of the ovary, and hysterectomy after cesarean section, one each. In another instance the fibroid uterus approximated the size of a pregnancy at 12 to 14 weeks. Vaginal removal of this could have been done, though probably with difficulty. In 2 other instances with small myomas, the vaginal procedure should have been quite feasible. Obviously, then, so far as this series is concerned, vaginal hysterectomy was not applicable in a large majority of the fatal cases and therefore could not possibly have had any appreciable effect in further reducing the mortality.

Faults in operative technique. The operative technique or method of abdominal removal of the uterus varied considerably among the large group of operators who were responsible for this series. However, as stated above, the differences were not sufficiently distinct or clearcut to permit a statistical comparison between methods. We did attempt a check, though, on some faults or errors in technique which were responsible for or might have con-

tributed to fatalities. Of the several possibilities there was only one point concerning which any definite data were obtainable. Two of the 19 deaths of the 1941-1945 series were almost certainly attributable to postoperative intra-abdominal hemorrhage. Furthermore, in these cases the thought is inescapable that better treatment in the way of timely reopening of the abdomen, probably, and more extensive use of blood transfusion, more certainly, might well have changed the outcome. In another instance, reoperation and replacement of blood lost were successfully accomplished, though the patient died of pneumonia 4 days later. Quite possibly the early complication contributed to the fatality. These cases will be mentioned again.

REVIEW OF MORTALITY IN 1941-1945 PERIOD

A review of the deaths in the last 5 years was undertaken with the idea that, in view of the information now available, important points for further improvement might be revealed. In Table II it was shown that, in spite of marked reductions, the principal causes of death in the 1941-1945 period were the same as in the first; that is, infection or peritonitis, hemorrhage with shock and cardiac failure, and pulmonary embolism. These causes, accordingly, offered the most fertile field for investigation.

A study of the case histories of the fatalities from peritonitis and infection leaves one with the distinct impression that different treatment might have changed the outcome in the majority. For example, in one case no chemotherapy at all was given, and in another it was not started until the day of death. Both of these cases occurred in 1943. In two patients anemia of profound degree was insufficiently treated preoperatively in one, and not at all in the other. Moreover, in the former, a hemoglobin reading of just 40 per cent resulted from the one and only postoperative transfusion. In a fifth patient, 10 grams of sulfanilamide placed in the peritoneal cavity after the bowel had been entered was the extent of chemotherapy; and, though two blood transfusions were given, the resulting hemoglobin level was only 30 per cent. The sixth patient apparently received every possible aid without results because of widespread carcinomatosis, peritonitis, and coronary thrombosis as shown by postmortem examination.

Of the 4 deaths due to pulmonary embolus there were two of the usual type occurring on the fifth and ninth postoperative days with apparently no suspicion of trouble preceding the accident. Another was stricken when she was to all appearances uneventfully convalescing 12 days after wound disruption and resuture. The fourth died suddenly 15 days after operation, during the last 7 of which the patient had been allowed out of bed despite daily temperature elevation ranging between 101.4 and 102.4 degrees. Due to lack of adequate clinical data in these cases, comment on the feasibility of vein ligation must be deferred. Certainly, in the last case one might seriously question the advisability of ambulation in the presence of obvious infection.

Acknowledging again the questionable propriety of grouping deaths from shock, hemorrhage and heart failure, we repeat that this was done (1) to permit comparison with our first series, and (2) because these conditions were difficult of differentiation in certain cases. As an example of the latter, a patient with mitral valve insufficiency expired on the operating table in the course of the difficult removal of a densely adherent myomatous uterus. In view of the precarious condition of the patient, one might well question the wisdom of undertaking the operation in the first place, or of continuing it after the abdomen was opened and the probable dangers were demonstrated. Quite possibly not belonging in this group at all was a death one week following operation after 36 hours of acute illness which was diagnosed as probable coronary occlusion but with a considerable possibility of pulmonary embolism as the true cause. Another, a 49 year old woman on the eleventh postoperative day and 5 days after secondary wound closure for evisceration died rather suddenly with no pertinent postmortem findings other than moderate basilar lung congestion and acute cardiac dilatation. The two remaining cases were mentioned under the discussion of operative technique as instances of postoperative intra-abdominal hemorrhage with the distinct possibility of a different re-

sult had treatment been more timely and energetic in the control and replacement of the blood loss.

Of the remaining 4 patients, one who was known to have marked hypertensive disease died on the seventh day from renal insufficiency and apoplexy after removal of a fibroid uterus and large ovarian cyst. Another died of uremia 2 weeks after cesarean section and supravaginal hysterectomy for severe premature separation of the normally implanted placenta with marked hypertension (200/120) and albuminuria. The third died in diabetic coma 6 days after operation in spite of all that could be done. The advisability of operation on this patient for a chronic condition, even though there was marked disability, might be questioned. The last patient was the third case discussed under operative technique. She was successfully operated upon for postoperative and intra-abdominal hemorrhage, was transfused adequately, but died 4 days later of pneumonia in spite of all treatment. What part the early and probably preventable hemorrhage might have played in initiating the pneumonia cannot be determined.

From this analysis it would appear that in at least 11 of the 19 cases one or more preventable factors featured the preoperative or postoperative care or operative technique which to some degree influenced the fatal outcome. While one must charitably concede mitigating circumstances in certain instances, the faults (notably of omission) in others are obvious, even allowing for the greater wisdom and clarity of hindsight. It seems evident that further improvement of hysterectomy mortality can be attained only by more energetic employment of the factors which we believe accomplished the good results in the latter years of our series. Perhaps it is not too much to hope and expect that by continuation of such treatment the death rate in the next 5 year period will again be reduced 50 per cent.

SUMMARY

A review of the 6,692 abdominal hysterectomies performed at Harper Hospital from 1928 to 1945, inclusive, revealed a marked decline in mortality. In an effort to determine the factors responsible for this improvement, a comparison was made of the results during the first and the last 5 year periods and for the intervening years of the series. This study showed that along with an increase in the numbers of hysterectomies of all types there was also a steady growth in the proportion of total hysterectomies. The mortality curve for the 18 year span demonstrated a consistent lowering of the death rate for hysterectomy from 3.7 per cent in the first 5 year group to 0.78 in 1941-1945. Subtotal hysterectomy mortality declined from 2.8 to 0.76 per cent, while the panhysterectomy deaths dropped from 7.3 per cent to 0.80.

In an investigation of the principal causes of death it was found that while infection, hemorrhage (shock and heart failure), and embolism played the main rôles, their incidence in the last 5 year group was greatly reduced over that of the first period. The part played in this reduction by various factors such as better selection of cases, blood transfusion, and chemotherapy was considered. It seemed evident that the greatest responsibility in the lowering of hysterectomy mortality was ascribable to the increasing use of blood transfusion. This factor antedated the advent of chemotherapy, which probably also caused some improvement though not statistically shown in this series.

An analysis of the last 5 year period, in the light of the data derived from this study, indicated that in 11 of the 19 deaths a more careful attention to certain potent features of preoperative, operative, and postoperative care might have accomplished a different result. It is suggested that future improvements in mortality rates can be achieved by more energetic application of these beneficial factors.

STRANGULATED FEMORAL HERNIA: SURGICAL MANAGEMENT

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A FEMORAL hernia is more likely to undergo acute strangulation than is any other type of hernia. Strangulation may occur at any time, and often under the most unfavorable circumstances. When a femoral hernia becomes acutely strangulated, it constitutes an urgent surgical emergency that requires prompt diagnosis and early operation. The time element is one of the most important factors affecting the prognosis. The seriousness of this disease may be attributed to the frequency with which a segment of small intestine is strangulated and to the rapid development of pathologic degeneration in the constricted portion.

On many occasions emergency operations for acute strangulation in such a situation necessarily are performed by younger surgeons. Often these well trained but less experienced surgeons are somewhat dubious concerning the proper surgical management of strangulated femoral hernia, especially when dealing with the contents of the hernial sac. It is a well known fact that often, when circumstances are more unfavorable, even the widest surgical experience and judgment may prove to be inadequate and fallacious. The surgeon's decision and technical skills exercised at the operating table may have a profound effect on the end-results. Under such confusing and extraordinary conditions, the use of certain operative procedures may contribute greatly to the unfavorable postoperative results frequently encountered in the condition under consideration.

Hence, it is essential that every surgeon who performs emergency operations familiarize himself with the accepted methods and technical procedures for overcoming the many problems presented by a strangulated femoral hernia. For successful management of acute strangulation and to assure a more favorable prognosis, it is necessary for the younger surgeon, especially, to exercise his best surgical judgment and technical skills in adapting routine operative procedures to the individual case.

Many treatments have been proposed for the surgical management of strangulated femoral hernias, and each one has its particular advantages. However, because acute strangulation in every instance requires prompt attention and individual consideration, the time element does not allow for an appraisal of the many suggested methods of management at the operating table. Unfortunately, "trial and error" treatment is practiced in far too many cases. Perhaps this empirical procedure may be an important factor in the persistence of the high fatality rate in cases of strangulated femoral hernia.

To learn as much as possible about the management of strangulated femoral hernias, a recent comprehensive study of 104 patients treated surgically at the Mayo Clinic during the period from 1907 to 1946 has been made by one of the authors (Jarboe). Believing that the observations and conclusions derived from this review may be helpful to other surgeons in determining the proper surgical management of patients who have acutely strangulated femoral hernia, the authors have collected the investigative findings for discussion. An analysis and evaluation of the surgical management exercised in the 104 cases may be of value in formulating new proposals of treatment that may result in a more favorable outlook for the patient who has a strangulated femoral hernia.

To treat any femoral hernia successfully, the surgeon should possess adequate knowledge of the anatomic relationships in the femoral and inguinal regions, and he should be familiar with the physiologic and pathologic

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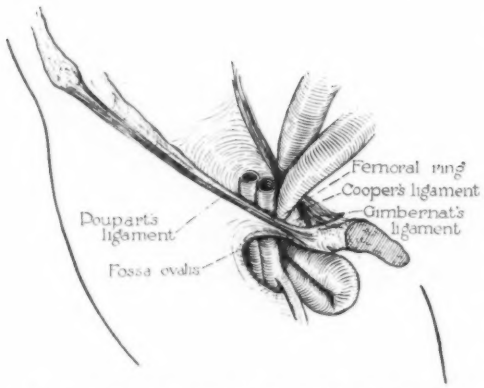

Fig. 1. Anatomic aspects of a femoral hernia, showing a loop of intestine strangulated at the femoral ring.

conditions created by acute strangulation. Since femoral and inguinal hernias often are misdiagnosed, it follows that the surgeon must attain to a sound and extensive knowledge of anatomy, physiology, and pathology in order to be able to carry out differential diagnosis and proper operative management of the respective herniation.

ANATOMIC ASPECTS

Acute strangulation occurs more frequently in the presence of femoral hernias than in other types because the constricting site is the small, rigid, femoral ring through which herniation occurs. The oval-shaped femoral ring is the internal opening of the femoral canal, and it communicates with the abdomen. The femoral ring is bounded laterally by the femoral vein, anteriorly by the inguinal (Poupart's) ligament, medially by the sharp-edged lacunar (Gimbernat's) ligament, and posteriorly by the superior ramus of the pubic bone, Cooper's ligament, pectineus muscle, and fascia. The short femoral canal extends downward from the femoral ring and terminates at the fossa ovalis, which is an aperture in the fascia lata of the thigh that is situated below the midpart of the inguinal ligament and about 3 centimeters lateral to the pubic tubercle. These anatomic relationships are shown in Figure 1.

When strangulation takes place at the femoral ring, the anatomic structures affected are the hernial sac (formed from parietal peritoneum, preperitoneal tissues, and transversalis fascia) and the contents of the sac.

CAUSE OF STRANGULATION

The actual cause of acute strangulation itself is mainly theoretic. It is assumed that femoral herniation occurs with increased intra-abdominal tension that forces the hernial sac and its contents to protrude through the femoral ring. If this herniation is prolonged, the sharp constricting edge of Gimbernat's ligament may inhibit the return of the femoral sac and its contents to the abdomen. Thus, an incarcerated femoral hernia is formed, and this may become a strangulated hernia if venous compression and circulatory impairment should follow.

RESULTS OF STRANGULATION

When strangulation occurs, pathologic changes such as congestion, edema, diffuse hemorrhage, necrosis and gangrene, take place in the constricted hernial sac. The hernial sac usually is small and globular, but these characteristics often are altered by the volume and pathologic condition of the contents of the sac. Since a portion of small intestine is found very frequently in the strangulated hernial sac, it is obvious that various degrees of intestinal obstruction often are associated with these hernias.

DIAGNOSIS

Acute strangulation of a femoral hernia is a common cause of acute intestinal obstruction among patients more than 50 years old; hence, the clinical diagnosis should not be difficult if the condition is given adequate consideration. However, the incidence of diagnostic error is high and is at times responsible for delayed operation.

A painful, tense mass in the groin had been present in 100 cases of the 104 concerned herein, but the significance of this mass often was misinterpreted and was the commonest diagnostic error. In many cases in which the medical diagnosis was misleading, the patient's objective manifestations indicated to the surgeon the urgent need of immediate operation more so than did the diagnostic impressions.

It was often difficult to make the differential diagnosis between femoral hernia and inguinal hernia, so that in all cases in which the diagnosis was doubtful, the latter condition was suspected. In such cases the anatomic relationships of the mass in the groin to the inguinal ligament and pubic spine may be helpful in diagnosis. Usually, a femoral hernia pushes forward and upward to override the inguinal ligament, whereas an inguinal hernia makes the ligament more distinct. A femoral hernial mass can be palpated laterally and slightly inferiorly to the pubic spine, whereas an inguinal hernial mass is palpated superiorly and medially to the pubic spine.

When a presumptive diagnosis of acute intestinal obstruction is made, especially in aged patients, it is the surgical consultant's ultimate responsibility to examine carefully all external hernial orifices to determine the presence or absence of an acutely strangulated hernia as an etiologic basis for the complaints. Careful examination of the hernial orifices is an important and significant part of every physical examination.

TREATMENT OF STRANGULATION

The one and only treatment for a strangulated hernia is immediate surgical operation. Valuable time should not be sacrificed in an attempt to reduce the strangulation by taxis, because the fatality rate increases with each hour that operation is delayed. The prognosis is most favorable when operations are performed within 24 hours after the onset of acute strangulation.

Time element. In the 104 cases under consideration, the elapsed time from the onset of acute strangulation until operation ranged from 1 day (fatality rate of 13 per cent) to 4 days (fatality rate of 70 per cent). The importance of the time element in all cases of strangulated femoral hernia cannot be overemphasized. The rapidity with which pathologic changes develop in the contents of the strangulated hernial sac is variable and cannot be ascertained until the sac is opened at operation.

In one case in which operation was performed 2 hours after the onset of clinical manifestations which indicated strangulation, the hernial sac contained a loop of gangrenous small intestine. Generally, pathologic degeneration develops slowly, but in any case this progression can be interrupted only by surgical release of strangulation. Otherwise, irreversible changes occur in the contents of the sac. Usually, the responsibility for this unfortunate delay can be attributed to the patient who needlessly sacrifices invaluable time by postponing medical and surgical treatment until his condition becomes critical.

TABLE I.—TYPE OF SKIN INCISION EMPLOYED IN 104 CASES

Incision	Cases
Inguinal, above and parallel to inguinal ligament	65
Femoral, below and parallel to inguinal ligament	7
Vertical, over hernial sac	8
Low rectus	6
Low midline	3
Not reported	15
Total	104

Anesthesia. The method of anesthesia employed for operation depended mainly on the clinical condition of the patient. Before 1932, when spinal anesthesia was first used in operations for strangulated femoral hernia, general inhalation anesthesia with ether was the method used most frequently. For 23 critically ill patients, local infiltration or regional block anesthesia was used. The lowest fatality rate, however, was noted in the 32 selected cases in which intraspinal anesthesia was the method of choice.

Because the majority of patients suffering from strangulation of a femoral hernia of several days' duration are very poor operative risks, it is essential that each surgeon be thoroughly acquainted with the various anesthetic agents and routes of administration, so that this knowledge can be utilized in the proper selection of anesthesia for each patient. In critically ill patients, the damage caused by strangulation and the extent of surgical intervention required cannot be determined preoperatively. For these reasons, local infiltration anesthesia or carefully supervised spinal anesthesia is advocated in such instances. However, in all cases of acute strangulation, the method of anesthesia to be used should be adapted to the patient.

Skin incisions. There has been much comment on the relative merits of different surgi-

TABLE II.—STRUCTURES STRANGULATED IN HERNIAL SACS IN 104 CASES

Structure	Number times involved
Small intestine	64
Omentum only	22
Omentum and viscera	22
Urinary bladder	2
Sigmoid	4
Appendix	6
Meckel's diverticulum	2
Cecum	1
Adenomyoma	1
Endometrial hematoma	1
Total	125

cal approaches for exposure of a strangulated femoral hernia. The primary skin incisions that were used in operations in this series are listed in Table I.

The primary paramedian and midline incisions were made in 9 cases in which a strangulated femoral hernia was not suspected. In 5 cases a secondary inguinal incision was made when strangulation had been revealed.

Use of the vertical incision over the hernial mass or of the femoral incision below the inguinal ligament has been advocated by some surgeons. A small femoral incision below and parallel to the inguinal ligament gives poor exposure with little opportunity for investigation of intra-abdominal conditions. It is, however, the most rapid method of dealing with this surgical emergency. When it is employed, the sac can be identified, exposed, and incised and the contents noted—all within a few minutes. To treat the strangulated viscera properly, however, especially if a portion of small intestine is found in the hernial sac, it is often necessary to make a second incision in the lower part of the abdomen.

The inguinal incision, when made 1 to 2 centimeters above and parallel to the inguinal ligament, has been the surgical approach most preferred in exposure of a strangulated femoral hernia. According to Watson (1925), the inguinal incision has certain noteworthy advantages over the other approaches: (1) it affords the best exposure of the hernial sac and its contents; (2) constriction is quickly located and relieved; (3) an anomalous obturator artery is noted readily if it is present; (4) intestinal resection and anastomosis can be carried out easily without the exertion of traction on the mesentery; and (5) the incision permits inspection of the intestine above and below the point of strangulation. This incision, however, takes more time and is associated with an increased danger of peritoneal contamination with the contents of the hernial sac.

If exposure is adequate and the mesentery is sufficiently mobile, intestinal resection and anastomosis necessitated in cases of strangulated femoral hernia should be performed through one inguinal incision. When resection is performed through either a femoral incision or an inguinal incision, it should be remembered that prolonged traction on the mesentery often prevents the return of circulation to the bowel and may retard healing processes in the anastomosed loops. Douglas (1912) has pointed out the grave danger of contamination and peritonitis incident to the reduction and resection of a necrotic portion of intestine through a second abdominal incision.

In the series under consideration, primary resection and anastomosis of necrotic segments of ileum were performed through an inguinal incision in 7 cases, with 3 deaths (a fatality rate of 43 per cent). Primary resection and anastomosis were performed through a femoral incision below the inguinal ligament in 2 cases. Necropsy in each of the latter cases revealed that insufficient portions of ileum and mesentery had been removed at resection, since there was residual necrosis of both loops of the bowel. Ileal resection and anastomosis were carried out through a secondary paramedian incision in 7 cases, with 5 deaths (a fatality rate of 71.4 per cent).

TREATMENT OF CONTENTS OF HERNIAL SAC

With proper precautions taken to minimize contamination, attempts were made to release the constriction and to evaluate the viability of the contents of the sac. To facilitate reduction through the rigid femoral ring, it was necessary to incise the lacunar (Gimbernat's) ligament medially in 24 cases. The inguinal (Poupart's) ligament was divided in 18 cases. Both ligaments were severed in 1 instance. An abnormal obturator artery was encountered and ligated on 2 occasions.

Contents of hernial sac. The abdominal and pelvic viscera that were strangulated in the

104 hernial sacs are listed in Table II. That the contents of the hernial sac have a significant effect on the fatality rate is revealed by the fact that in sixty-four cases in which a segment or loop of small intestine had been strangulated, there were twenty-three deaths (a fatality rate of 36 per cent). In the forty cases in which strangulation of abdominal or pelvic structures exclusive of small intestine occurred (Table III), there was one death (a fatality rate of 2.5 per cent).

Viability of contents of sac. After release of the strangulation, the determination of viability of the contents of the sac and the subsequent surgical treatment were considered. In 40 cases in which abdominal or pelvic structures exclusive of the small intestine were strangulated, the decision as to viability was not difficult to make. Viability of the urinary bladder, cecum and sigmoid colon was assured after reduction of strangulation. The constricted portions of other structures (omentum, appendix, Meckel's diverticulum, adenomyoma and endometrial hematoma) were excised without incident in nearly all cases.

When a segment of small intestine had been strangulated in the hernial sac, determination of viability of the involved bowel after reduction was much more difficult, especially in cases in which the condition was intermediate. Viability was determined by observance of the return of arterial pulsations in the mesentery, and the return of a normal pink color and serosal luster to the affected segment of bowel. This physiologic recovery was stimulated by means of the application of warm saline compresses to the affected parts and by having the patient breathe pure oxygen. If circulatory improvement was not noted within 15 minutes, the affected portion of bowel was considered to be nonviable.

These procedures for determination of the viability of involved bowel consume valuable time and prolong the operation unnecessarily. Consequently, after successful experimental and clinical trials in 500 cases, Herrlin, Glasser and Lange in 1942 proposed two methods for determination of the viability of strangulated bowel when viability is doubtful.

Method 1.—Fluorescein test.—After the doubtfully viable segment of bowel has been exposed, 5 to 6 cubic centimeters of a 5 per cent solution of fluorescein is injected intravenously. The operating room is darkened, and the bowel is observed under ultraviolet light. Viable bowel produces a golden-green illumination; a nonviable segment remains dark.

Method 2.— Procaine test.—When amounts up to 10 cubic centimeters of a 2 per cent solution of procaine hydrochloride are injected locally around the mesenteric blood vessels, there is an immediate release of any vasospasm present, resulting in hyperemia and rapid improvement in circulation to the affected segment of bowel.

These investigators reported that these methods can be used, singly or together, with accuracy of 90 per cent, for ascertaining the viability of bowel. They can be used therapeutically for improvement of the circulation to questionable portions. Although these procedures were not used in any cases of the series concerned herein, perhaps they deserve special consideration and utilization in future deter-

TABLE III.—DETAILS OF OPERATIVE PROCEDURES EMPLOYED IN 104 CASES, AND HOSPITAL FATALITY RATES ACCORDING TO PROCEDURE EMPLOYED

Procedure	Cases	Deaths in hospital	
		Number	Per cent
Primary resection and anastomosis for gangrenous ileum	7	4	57.1
Primary resection and anastomosis for gangrenous ileum, with enterostomy in proximal loop of ileum	7	5	71.4
Exteriorization of gangrenous ileum with enterostomy and secondary resection	2	1	50
Reduction of gangrenous small intestine	1	1	100
Reduction of gangrenous small intestine plus enterostomy	1	1	100
Reduction of gangrenous small intestine plus exteriorization of necrotic loop	1	1	100
Reduction of gangrenous small intestine plus exteriorization of necrotic loop and enterostomy	1	1	100
Reduction of gangrenous small intestine plus invagination of necrotic part	3	2	67
Reduction of gangrenous small intestine plus invagination of gangrenous part and enterostomy	2	2	100
Reduction of gangrenous small intestine plus enteroanastomosis	1	1	100
Reduction of nongangrenous small intestine	37	4	10.8
Reduction of nongangrenous small intestine plus enterostomy	1	0	
Reduction or excision, or both, of strangulated viscera, exclusive of small intestine	40	1	2.5
Totals	104	24	23.1

minations of viability of the bowel in doubtful areas.

When viability of the contents of the hernial sac was determined at operation, methods were instituted for treatment of the nonviable portions of the strangulated viscera. Naturally, the surgical management depended on several factors, such as the amount of viscus strangulated within the hernial sac and the pathologic condition of the viscus concerned at the time of reduction.

To demonstrate the advantages or disadvantages of certain operative procedures commonly used in the surgical management of strangulated portions of small intestine, the operative details of each case in the 104 concerned herein were reviewed and classified accordingly. The operative procedures used in the 104 cases and the hospital fatality rates associated with each procedure are summarized in Table III.

Fatality rate after treatment of contents of hernial sac. Strangulated and nonviable segments of ileum were removed in 16 cases, with 10 deaths (a fatality rate of 62.5 per cent). In 10 cases the viability of the strangulated portion of small intestine was questioned, but because of the patient's poor condition, the segment was not removed. In these 10 cases there were 9 deaths (a fatality rate of 90 per cent). An obvious conclusion should be that although the fatality rate associated with primary intestinal resection is high, the fatality rate is much higher when questionably viable segments of bowel are returned into the abdomen without resection.

The high fatality rate associated with intestinal resection in the management of strangulated femoral hernia has been recognized and reported by many surgical investigators. Braun and Wortmann in 1924 reported a fatality rate of 50.4 per cent in cases in which resection was carried out; Frankau in 1931 reported a fatality rate of 42.8 per cent in such cases; McClure and Fallis in 1939 reported a fatality rate of 66.7 per cent; McNealy, Lichtenstein, and Todd in 1942 reported a rate of 60 per cent; and Jens in 1943 reported a fatality rate of 66 per cent in cases in which strangulated femoral hernia required resection of the small bowel. The fatality rate of 62.5 per cent associated with resection in this series thus compares favorably with other reported statistics.

In 40 of the 104 cases viscera other than the small intestine were strangulated in the hernia. The operative procedures used in the treatment of strangulated segments of the small intestine in the remaining 64 cases will be described and discussed separately. In this group of 64 cases, postmortem examination was performed in 20 of the 23 cases in which death occurred. A study of the necropsy reports has made possible practical evaluation of certain operative procedures and surgical judgments exercised at the primary operations.

The gangrenous portion of ileum was removed, anastomosis was carried out, and the abdomen was closed without drainage in 7 cases, with 4 deaths (57 per cent). In addition to primary resection and anastomosis, in 7 other cases an enterostomy tube was inserted into the proximal loop of the distended bowel. In these latter 7 cases there were 5 deaths (71.4 per cent). The removed portions of ileum and mesentery were from 6 to 45 centimeters long.

In 2 cases the gangrenous segment of ileum was exteriorized and removed according to a modified Mikulicz procedure, and there was 1 death (50 per cent). In each case an enterostomy tube was inserted into the proximal portion of the exteriorized loop of bowel.

Intestinal anastomosis. After the necrotic segments of ileum and mesentery had been removed, primary ileoileostomy re-established continuity of the small bowel in 14 cases. Side-to-side anastomosis was carried out in 6 cases, with 3 deaths (50 per cent). End-to-end anastomosis was performed in 8 cases, with 6 deaths (75 per cent).

Postmortem examination in 3 of the 8 cases in which end-to-end ileoileostomy had been performed revealed almost complete obstruction of the bowel at the site of anastomosis, in addition to leakage of foul liquid material through the gaping suture holes into the peritoneal cavity.

In 2 of the cases in which side-to-side anastomosis had been established, results of necropsy indicated that the union had been satisfactory in one instance, but that in the other, the stoma had been inadequate and had

caused partial obstruction with some distention of the proximal ileal loops. No evidence of leakage was reported.

On the basis of the end-results in these cases, it might be concluded that after removal of the nonviable segment and inversion of the cut ends of bowel, re-establishment of intestinal continuity by side-to-side anastomosis is a safe surgical procedure, especially for less experienced surgeons who might otherwise encounter considerable difficulty in anastomosing a distended hyperemic proximal loop, end-to-end, to the collapsed distal loop of bowel.

For the surgeon who encounters this type of hernia only occasionally, side-to-side anastomosis has some advantages: (1) it permits satisfactory anastomosis of a dilated proximal loop of bowel to a collapsed distal segment with less danger of leakage of the fluid contents of the bowel into the peritoneal cavity; (2) the large stoma which is created assures adequate drainage of the distended proximal loops of bowel and reduces the possibility of subsequent obstruction at the stomal site; and (3) at the time the anastomosis is carried out, overlapping of the mesenteries assures adequate circulation to the site of anastomosis. However, the oblique end-to-end type of anastomosis, when performed in selected cases by more experienced and adept surgeons, readily restores physiologic continuity to the intestine without the delay for readjustment that is often encountered after other types of anastomoses have been performed.

Enterostomy. After removal of the necrotic portion of ileum and primary anastomosis had been performed, drainage of the proximal loops of bowel by enterostomy tube was established in 7 cases, with 5 deaths (71.4 per cent). Necropsy carried out in 4 cases demonstrated that in each case the enterostomy tube had been inserted about 10 to 15 centimeters proximal to the site of anastomosis. In 2 cases necrosis and sloughing of the wall of the bowel around the tube had resulted, with leakage of much foul fluid into the peritoneal cavity. In another instance, the ileum was obstructed completely at the site of the enterostomy.

In 7 cases in which the strangulated portion of bowel was doubtfully viable but was not removed, enterostomy drainage was instituted, and there were 5 deaths (71.4 per cent). Of 14 cases in which enterostomy drainage had been established, necropsy in 10 revealed necrosis of that portion of bowel around the tube, and leakage of foul fluid into the peritoneal cavity in nearly all cases. In 2 cases marked constriction about the enterostomy tube had caused partial intestinal obstruction.

On the basis of the foregoing facts, it might be concluded that in cases of strangulated femoral hernia with inextensive intestinal obstruction, the establishment of drainage by enterostomy tube in the proximal portion of distended bowel greatly increases the operative risks. With ample consideration of the inherent dangers concomitant to the establishment of enterostomy drainage, increased efforts should be directed toward decompression of distention of the small bowel by other means. The use of Wangensteen's nasal suction apparatus, or some modification such as the Miller-Abbott or Wilson-Sawyer double-lumen tubes, for continuous drainage of the small bowel from the moment intestinal obstruction or distention is recognized, should obviate any need for enterostomy.

Exteriorization. The strangulated and gangrenous loop of ileum was exteriorized and secondarily removed in 2 cases, with 1 death.

The necrotic loop of small intestine was exteriorized but not removed in 2 cases; both patients succumbed. One patient died of diffuse peritonitis incident to replacement of the exteriorized loop into the abdomen 10 days after the first operation.

If the exteriorized nonviable loop of bowel is not removed primarily, the source of proteolytic toxins formed from necrotizing tissues remains, so that fatality may result from the toxemia alone. Although a primary removal of nonviable portions of strangulated bowel, followed by anastomosis, is the preferred surgical treatment, exteriorization and immediate removal of the strangulated loop is an alternative procedure when further surgical treatment is contraindicated. The risk of removal of the exteriorized loop of bowel is considerably less than that incident to replacement of the loop within the abdomen.

Invagination. There were 16 cases of Richter's hernia in which only a portion of the wall

of the small bowel was constricted within the femoral ring. In 5 of these cases, the strangulated portion was invaginated into the lumen of the bowel. There were 4 deaths in these 5 cases (80 per cent). Several inverting Lembert sutures (Summers' stitch) were placed in the seromuscular layers of the adjacent normal portion of bowel, so that the serosal layers were approximated over the inverted necrotic portion.

Necropsy showed definite constriction and intestinal obstruction at the site of inversion in 3 instances. Extensive necrosis of bowel and mesentery above and below the inverted segment, with perforation and leakage at the site of inversion, was found in the fourth case of the aforementioned five.

On the basis of these observations, it would seem that simple inversion of a small necrotic portion of the wall of the bowel is a procedure of questionable value in the surgical management of strangulated femoral hernia. When a nonviable segment is revealed, the results indicate that it is advisable to take the extra time necessary to perform primary resection and anastomosis, rather than to invert the strangulated segment of bowel and thereby produce more obstruction.

When abdominal or pelvic viscera other than portions of the small intestine had been strangulated in the hernial sac, the surgical management was directed primarily toward release of strangulation and reduction of the contents of the sac. Radical resection was unnecessary, and thus the greatly diminished operative risk in these cases is reflected in the low fatality rate of 2.5 per cent.

TREATMENT OF THE HERNIAL SAC

When the contents of the hernial sac had been reduced and treated, the sac itself was treated. In the majority of cases, and especially when a portion of the small intestine had been strangulated, the hernial sac was damaged to a lesser degree than its contents. However, the sac was congested and edematous in nearly all cases, and this increased the difficulties of its surgical management.

In 77 cases the hernial sac was closed at the neck by either a pursestring suture or simple ligature. It was than excised. When the inguinal approach was used, the stump of the sac was often transfixed under the conjoined tendon. In 8 cases the stump was simply inverted, as is done in the treatment of the sac of a direct inguinal hernia. When the sac was ligated and excised from below the inguinal ligament, the neck was freed from the femoral ring, and the stump was allowed to retract upward under the transversalis fascia.

In this series, the method of closure of the hernial sac apparently had little effect on the success of the operation, although a femoral hernia recurred in 2 instances in which the sac had been ligated from below the inguinal ligament. It would seem that high ligation of the hernial sac, with fixation of the stump under the conjoined tendon, offers ample insurance against subsequent femoral or direct inguinal herniation.

REPAIR OF THE HERNIA

The basic methods employed for surgical repair of the femoral hernia depended on the anatomic approach, either from above or below the inguinal ligament. More than 60 different operations have been enumerated for repair of a femoral hernia. Many plastic operations for filling the femoral canal by muscular, periosteal, osseous and heteroplastic flaps, are wrong in principle and have obtained little support, whereas the simpler operations for obliteration of the femoral canal and closure of the femoral ring have prevailed.

The femoral hernia was repaired in 80 cases of the series of 104, but often the methods used were not specified. In 24 cases in which the surgical risk was excessive, the release of strangulation and treatment of the contents of the sac were more important than the method of repair of the hernia.

In 4 cases in which strangulation was treated through a femoral approach, below the inguinal ligament, the femoral ring and femoral canal were not repaired surgically, an action which was in accord with the procedure recommended by Ochsner in 1906. It was assumed that after reduction of the femoral hernia and ligation of the sac, the femoral vein would re-expand gradually to come into contact with Gimbernat's ligament, thus obliterating the femoral canal. When this method

was used, however, femoral hernia recurred in 2 cases.

Repair of the femoral hernia was performed from below the inguinal ligament in 15 cases. In 7, closure of the femoral ring and canal was achieved by a single "Coley stitch," in which a pursestring suture of chromicized catgut was placed to approximate the inguinal ligament, medial wall of the femoral vein, pectineus muscle and fascia, and Gimbernat's ligament. In the other cases, the pectineus muscle and fascia and the lower edge of Gimbernat's ligament were approximated to the inguinal ligament, with the use of one to four chromicized catgut mattress sutures. The surgeon avoided the infliction of trauma to the femoral vein by retracting it with his index finger while the sutures were being placed. This procedure obliterates the femoral ring and canal without constriction of the femoral vein.

After reduction and treatment of strangulation had been carried out, the femoral hernia was repaired from above the inguinal ligament in 65 cases. One of the following procedures was employed in each case.

Simple closure. Simple closure of the femoral ring included the use of a pursestring suture to approximate the inguinal ligament, medial wall of the femoral vein, Cooper's ligament, and Gimbernat's ligament. One recurrence followed this type of hernial repair.

Moschcowitz type of operation. In the performance of this operation the inguinal ligament was sutured to Cooper's ligament.

Lotheissen's or some modification of Annandale's original inguinal operation. In the performance of this operation the conjoined tendon, the mobilized rectus sheath, external oblique aponeurosis, or the transversalis fascia was sutured to Cooper's ligament. This placed a firm musculofascial barrier over the femoral opening to inhibit any subsequent femoral or direct inguinal herniation. The ultimate success of this operation depended on sound healing of the apposed structures, which often were out of alignment or were sutured under tension.

When the inguinal approach was used, the operation usually was concluded with surgical repair of the inguinal canal. If the internal inguinal ring was enlarged, or if there was muscular relaxation in Hesselbach's triangle, then the spermatic cord (round ligament in females) was transplanted subcutaneously and the external oblique aponeurotic flaps were imbricated beneath it.

SEQUELAE

In the 80 cases in which the femoral hernia was repaired, there have been 3 known recurrences (a rate of 3.8 per cent). In addition, direct or indirect inguinal hernias have developed on the same side in 3 patients. In each of the latter cases, the femoral hernia had been repaired from below the inguinal ligament. Perhaps, if the inguinal operation had been done originally, any relaxation of the internal inguinal ring or muscular weakness of the inguinal canal might have been recognized and repaired then.

COMMENT

Many of the problems presented by a strangulated femoral hernia have persisted in spite of previous studies. Just what constitutes "proper surgical management" of a strangulated femoral hernia is one of the problems the answer to which is dependent on the many circumstances of each case. No specific routines of management can be elaborated which will overcome effectively the many barriers and handicaps presented by any 2 cases of strangulated femoral hernia.

In the management of acute strangulation, the surgeon's ingenuity frequently is challenged by the confusing and changing circumstances enveloping each case. Even for experienced surgeons, the best judgment and technical skill often prove faulty and inadequate. But with reliance on the acquired knowledge of the anatomic, physiologic, and pathologic elements involved in strangulation, the obstacles may be removed one by one, and the operative results should be gratifying.

Some of the conflicting and confusing circumstances concerning the surgical management of strangulated femoral hernia have been presented and discussed in this paper. The authors hope that the observations and conclusions will be helpful to other surgeons who may be confronted with this condition at the operating table.

SUMMARY AND CONCLUSIONS

A comprehensive review of the problems presented in 104 cases of strangulated femoral hernia has been made by one of the authors (Jarboe). It has been demonstrated that the surgical management is dependent on and determined by the clinical and pathologic conditions in each case. The most commonly used operative procedures have been appraised and evaluated. The responsibility for the unfavorable results often encountered has been attributed to the respective causative factors, when possible.

From this study of the surgical management in 104 cases of strangulated femoral hernia, a number of observations and conclusions may be derived.

First, acute strangulation of a femoral hernia is a serious surgical emergency condition in which the time element is an important factor affecting the surgical management and ultimate prognosis.

Second, a tense, painful mass in the groin, especially when it is associated with clinical evidence of acute intestinal obstruction, must be considered a strangulated femoral hernia until proved otherwise by operation.

Third, the inguinal operation for strangulated femoral hernia is recommended.

Fourth, primary removal, which is followed by anastomosis, is advocated when a segment of small intestine is strangulated and nonviable.

Fifth, when the viability of a strangulated viscus is questionable, the risk of removal of the involved part is less than the risk of replacement of nonviable structures in the abdomen.

Sixth, exteriorization and the immediate removal of the necrotic portions of bowel are alternative procedures in those cases in which additional surgical treatment is contraindicated.

Seventh, the inguinal operation, with repair of the femoral and inguinal canals, offers the best insurance against recurrent femoral or inguinal herniation.

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THE MECHANISM OF PRODUCTION OF LINEAR SKULL FRACTURE

Further Studies on Deformation of the Skull by the "Stresscoat" Technique

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THE application of the "stresscoat" technique for the determination of strains following blows upon the skull has been described previously (1). The path and pattern of strains on the external surface of the skull following blows of known energy were studied and have been reported upon (2, 3). In the present contribution the strain paths on the external and internal surfaces of the skull have been studied simultaneously. The configuration of strain patterns on the internal surface of the skull are most revealing and help to formulate a more complete view of the mechanism of linear fracture from general deformation of the skull in head injury.

PROCEDURE

Fresh cadaver skulls were obtained from the anatomical laboratory of Wayne University College of Medicine. The skulls were boiled for several hours to facilitate the removal of skin, muscles, dura, etc. The dura usually could be pulled loose and removed in several large pieces by working with long forceps through the foramen magnum. After drying for several hours the skulls were washed thoroughly with ether.

The skulls were now coated inside and out with a thin coat of aluminum lacquer which gives a uniform background for the "stresscoat." After a drying period of 15 to 20 minutes, the skulls were sprayed with the "stresscoat." A lacquer was chosen which had a strain sensitivity of 0.00095 to 0.00105 inch per inch for the prevailing temperature and humidity conditions. Spraying of the interior of the skull was accomplished by means of an 8 inch extension rod attached to the spray gun. The extension was inserted through the foramen magnum. This method was found to be the best of several tried to coat the interior of the skull. Another method consisted of mounting the skull on a turntable and rotating it at a constant rate while directing the spray over the internal surface. However, it was found that the best results were obtained by manipulating the skull in one hand and directing the spray at the same time with the other. With a little practice it was possible to obtain a coating of a reasonably uniform thickness over practically all of the internal surface. Several calibrating strips used to determine lacquer sensitivity were run with each test.

The lacquer was permitted to dry for 24 hours before testing. The skulls were suspended above a polished steel block, weighing several hundred pounds, by means of a silk thread. The thread was tied around the skull in such a manner that when the skull was dropped it hit the steel slab so that the center of gravity of the skull was vertically above the point struck. Also, care was taken to see that the blow was delivered normal to the surface being struck. The weight of the skull and the distance through which it was dropped determine the amount of energy absorbed. These experiments were carried out with a constant energy of 16 inch pounds. After hitting the steel surface the skull was caught on the rebound to prevent damage to the lacquer from secondary bounces.

The skull was now sawed in two by means of an electric circular bone saw. The bisection was carried out in such a way that it would not

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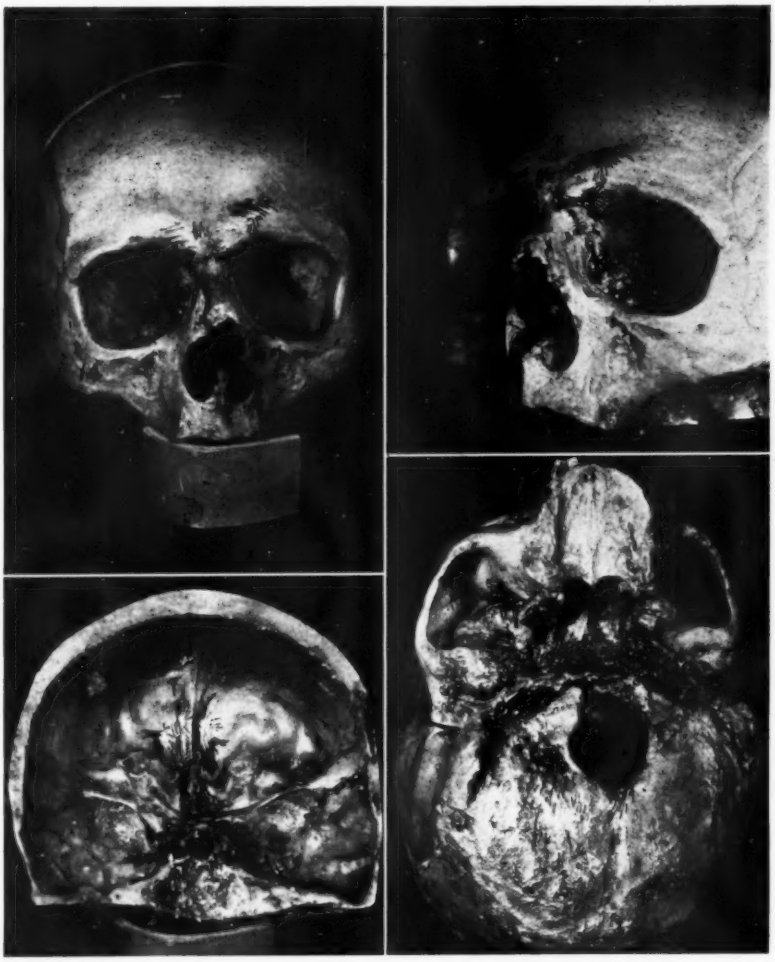

Fig. 1. A midfrontal blow at the nasion. In the upper left cracks are seen in the lacquer surrounding the area of impact and extending across the midline. The ones inferior to the area of impact further extend to the medial and superior wall of the orbit on both sides. This is better seen in the upper right. In the lower left, a starlike pattern is noted on the internal surface of the skull. This pattern is definitely interrupted by the midfrontal buttress. In the lower right cracks are seen in the lacquer covering the squamous portion of the occipital bone and extending toward the foramen magnum. These may be considered contrecoup in type.

interfere with the deformation patterns obtained. The sawing itself did not produce cracking of the lacquer in any case.

The deformation patterns were next developed with red dye etchant applied for about 40 seconds and then removed with the etchant emulsifier. The dye penetrated any cracks that formed as a result of the blow. They were traced with India ink and photographed.

MATERIAL

In Table I the number of the experiment, the location of the blow, the weight of the skull, the distance through which it was

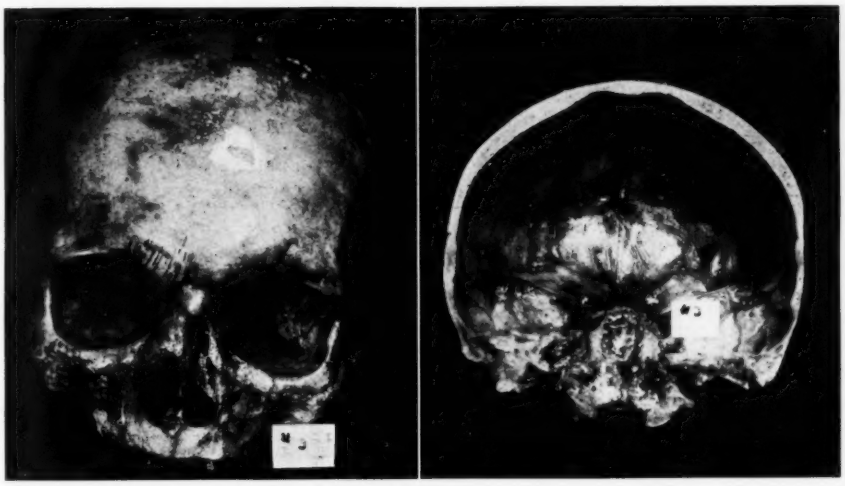

Fig. 2. A frontal blow to the left of the midline. On the external surface of the skull are seen cracks in the lacquer extending downward toward the nose and the roof of the orbit to the right of the midline. On the internal surface of the skull there is a series of cracks in the lacquer forming a star, with some cracks crossing the midline and extending downward toward the anterior fossa.

dropped, and the sensitivity of the lacquer are given. Deceleration blows were studied in the following positions: (1) frontonasal junction at the midline, (2) midfrontal, (3) frontal region lateral to the midline, (4) lateral frontal, (5) midline anterior interparietal, (6) temporoparietal, (7) lateral parietal, (8) midline posterior interparietal, (9) lambdoid suture neighborhood halfway between midline and mastoid, and (10) midline occipital. In some locations more than one skull was used. The resultant patterns are briefly described and can also be seen in the accompanying figures.

Frontonasal blow at the midline. Following a blow at the frontonasal junction at the midline the area of contact was butterfly shaped and it involved the frontal bone on both sides of the midline just above the orbits. On the internal surface of the skull, an irregular star pattern was noted somewhat disjointed by the midline frontal buttress. On the external surface there were some cracks in the lacquer surrounding the area of impact and others extending into the roof of the orbit on both sides. On more than one occasion such a blow was associated with contrecoup cracks in the lacquer at the base of the skull near the foramen magnum. These cracks traversed the occipital bone in the anteroposterior direction (Fig. 1).

Midfrontal blow. After a midfrontal blow on the external surface of the skull there were cracks in the lacquer extending toward the roof of the orbit on one or both sides, with some cracks along both frontosphenoid junctions. In Figure 2 a midline frontal blow is characterized by a star pattern on the internal surface with cracks in the lacquer extending across the forehead to the roof of the orbit on the external surface of the skull. The external cracks begin as the internal pattern ends. In Figure 16 a midfrontal blow near the bregma is represented with the internal pattern in red and the external cracks in black. There is an outbending of the skull peripheral to the area of inbending in the region of impact. The outbending occurs in at least two planes, in the right forehead in the superoinferior plane, and in the left forehead the outbending is obliquely from side to side.

Frontal blow lateral to the midline. On the interior of the skull a star-shaped series of cracks in the lacquer are noted. On the exterior of the skull there are cracks in the lacquer extending toward the roof of the orbit and the lateral frontal region. The external

Fig. 3. Left frontal blow. In the upper left photograph, cracks can be seen in the lacquer extending down toward the roof of the orbit and continuing on along the superior wall of the orbit. Most of these occur on the left side. A few cracks are also seen at the frontonasal junction. These also extend toward the roof of the orbit. In the upper right photograph the pattern surrounding the area is better seen with some cracks also noted superiorly and medially. In the lower left, the lateral view of the skull on the left side discloses the strain patterns extending downward and posteriorly toward the temporal bone. There are also some cracks in the lacquer in the anterotemporal bone just above the zygomatic arch. In the lower right, the internal surface of the skull shows a star pattern with cracks extending for longer distances medially than laterally. This arrangement can be explained by virtue of the fact that the radius of curvature laterally changes much more abruptly than medial to the star pattern.

cracks appear at a point where the cracks on the internal surface end. A frontal blow lateral to the midline involved mainly the orbit on the same side, but a few cracks were found crossing the nasion to the opposite side (Fig. 3).

Lateral frontal blow. On the internal surface, a well formed star, more extensive in the anteroposterior direction than from above downward is noted. On the external surface a series of cracks extend down toward the temple, and a few also involve the zygomatic arch. Again, the external cracks begin just where the internal cracks end (Fig. 4). In Figure 17 a composite representation of the internal and external patterns is given. The red colored lines represent the internal pattern and the black lines are those found on the external surface of the skull. Note that the black lines begin where the red lines have just ended. An inbending about the area of impact and an outbending in the anterior temple producing strains in the anteroposterior direction can be noted.

Midline anterior interparietal blow. Following a midline anterior interparietal blow the skull showed a star-shaped series of cracks on

TABLE I.—SUMMARY OF EXPERIMENTS

Skull No.	Weight lbs.	Distance dropped inch	Lacquer sensitivity inch per inch	Location of blow
1	1.28	12½	0.00100	Right posterior parietal
2	1.22	12 13/16	0.00105	Midline occipital
3	1.76	9⅛	0.00095	Midline frontal
4*	2.46	6½	0.00095	Posterior interparietal
5	1.44	11⅛	0.00105	Left frontal
6	1.53	10½	0.00105	Anterior interparietal
7	1.70	9 7/16	0.00095	Right occipital
8	1.87	8 9/16	0.00095	Midline occipital
9	1.60	10	0.00105	Midline frontonasal junction
10	2.09	7 11/16	0.00105	Left parieto-occipital (lambdoid suture neighborhood)
12	1.80	8⅞	0.00095	Midline frontal
13	2.10	7⅝	0.00105	Right temporal
14	1.70	9 7/16	0.00105	Midline frontonasal junction
15	2.22	7 9/16	0.00105	Midline occipital
16	1.65	9 11/16	0.00100	Right mastoid
17	1.70	9 7/16	0.00100	Right parietal
18	1.58	10⅛	0.00105	Midline frontonasal junction
19	1.40	11 7/16	0.00105	Right temporal
20	1.71	9⅜	0.00105	Posterior interparietal
21	0.99	16 3/16	0.00100	Right occipitoparietal (lambdoid suture neighborhood)
22	1.36	11¾	0.00100	Right lateral frontal
23	1.91	8⅜	0.00100	Midline frontal
24	1.85	8⅝	0.00105	Right parietal
25	1.38	11 9/16	0.00105	Right lateral frontal

*Skull too thick, no strain pattern obtained.

its internal surface somewhat more extensive anteriorly and longer in the left lateral direction. This was associated with cracks in the lacquer appearing on the external surface of the skull in such a manner that the external cracks dovetail with the internal ones. The most prominent external cracks are those extending perpendicularly downward toward the temple on both sides (Fig. 5). In Figure 18 the internal (red) and the external (black) patterns are reprinted together. Note that the region about the point of impact is inbended in an asymmetrical manner. This is in turn surrounded by an outbending of the skull with strains on the anteroposterior direction in the parietotemporal neighborhood and from side to side, posterior to area of inbending.

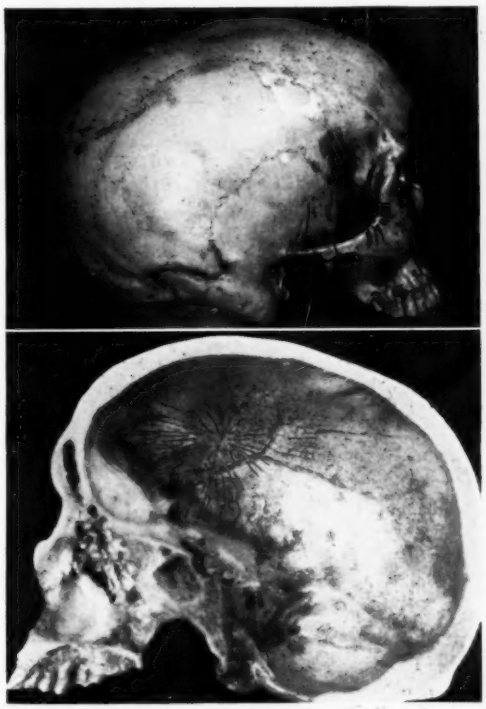

Fig. 4. A lateral frontal blow, left frontal parietal junction. In the upper photograph, cracks in the lacquer downward toward the temple are seen and a few cracks are also seen on the zygomatic bone and arch arranged radially. On the internal surface, in the lower photograph, a star pattern is again noted. This star is much more extensive anteroposteriorly than superoinferiorly. In Figure 17, when the patterns on the internal and external surface of the skull are superimposed, it becomes apparent that the external patterns appear at the border of the internal patterns.

Temporoparietal blow. On the internal surface the usual star with fairly long extensions anteriorly and fairly limited propagation superoinferiorly is noted. This region is surrounded on the outside of the skull with cracks in the lacquer extending downward and forward toward the temple, others extending posteriorly toward the midline, and still others superiorly toward the midline. Corresponding to the border of the star pattern on the internal surface of the skull there are circular lines on the external surface. Some cracks in the lacquer at the base on the same side are also seen (Fig. 6).

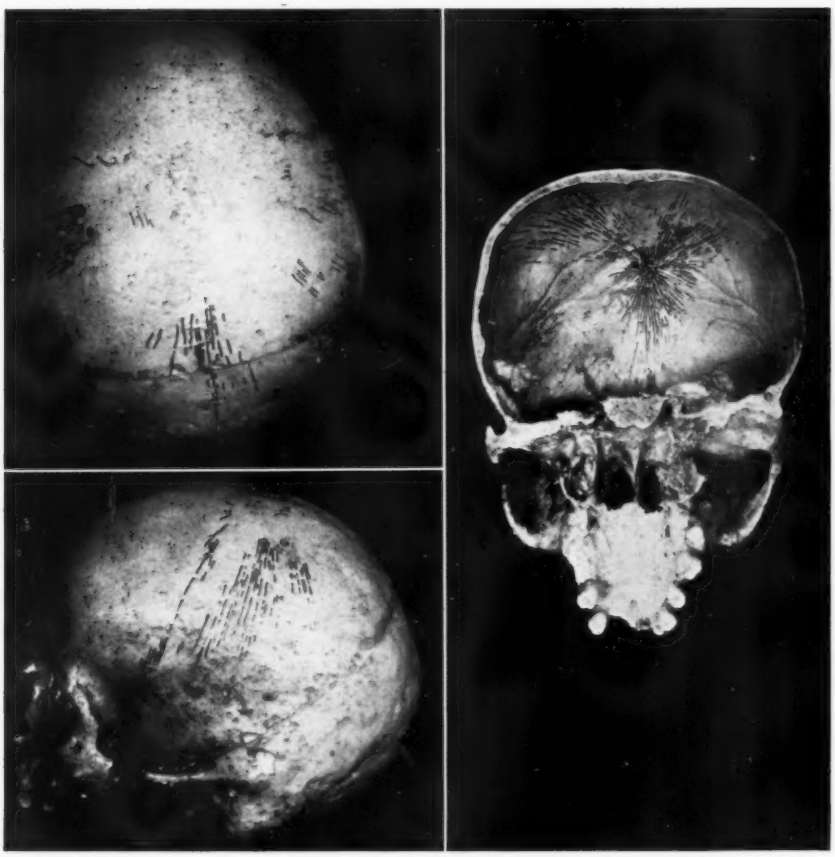

Fig. 5. An interparietal blow at the midline near the frontoparietal junction (bregma). The upper left photograph shows the strain pattern on the superior surface of the skull. Several discreet groups of cracks are seen extending laterally and downward. Another group extends posteriorly at the midline. In the lower left figure the cracks appearing on the lateral surface of the skull are seen coursing toward the temple on the left. The same configuration is noted on the right side. On the interior of the skull seen in the photograph to the right, a star pattern is again noted with more marked propagation along the anterior midline and laterally on either side, with a rather abrupt stoppage of the pattern posteriorly at the midline. On careful superimposition, and as seen in Figure 18, the pattern on the internal surface of the skull fits in between the group of cracks in the lacquer seen on the external surface of the skull.

Lateral parietal blow. In one specimen only a star on the internal surface of the skull was noted with no pattern on the outside except for a few cracks on the anterior temporal region. It should be noted that this is a rather thick skull (Fig. 7). Again, the anteroposterior dimensions of the star are much more extensive than the superoinferior. In Figure 8 a series of cracks appear on the external surface of the skull suggesting a strain anteroposteriorly in front, superoinferiorly in the temporal bone and anteroposteriorly in the posterior inferior parietal region. Note that the strains in the posterior inferior parietal region are about at right angles to the strains occurring in the anterior parietal region near the temporal bone. On the internal surface the star pattern dovetails with the exter-

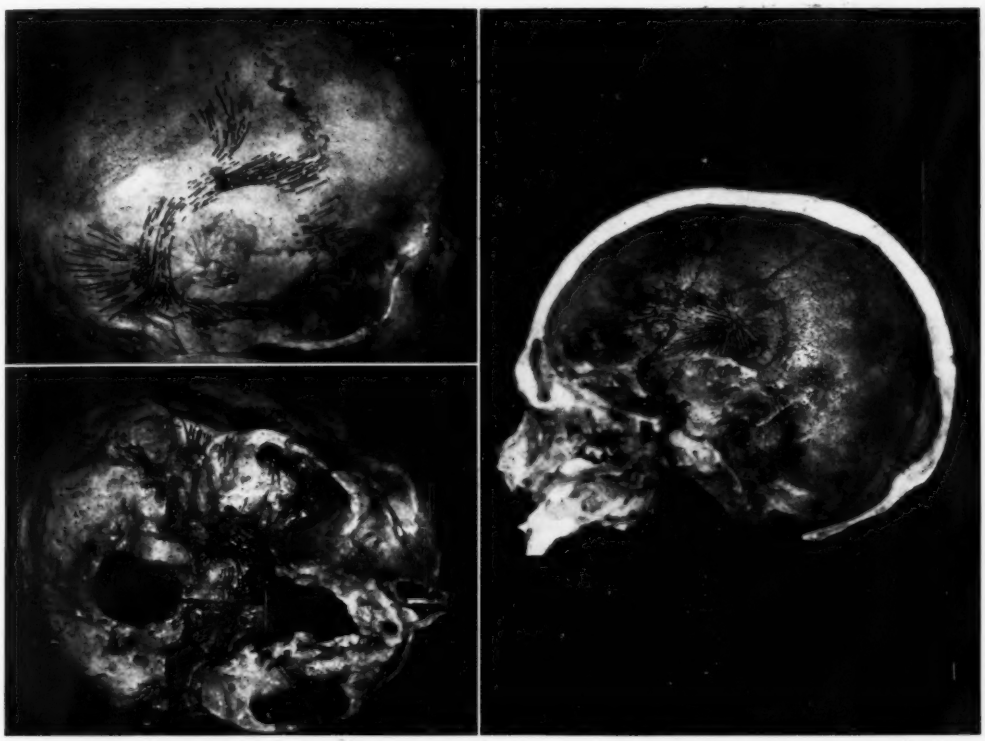

Fig. 6. Temporoparietal blow on the right side. In the upper left there is an area of lacquer surrounding the impact which is devoid of cracks. This is in turn surrounded by circularly arranged cracks which extend downward and forward in the anterior and inferior portions, upward and forward superiorly, downward and backward posteriorly. In the lower left, there are some cracks at the base of the skull as far as the basilar portion of the occipital bone. In the photograph to the right, the internal surface of the skull shows a star formation with the cracks extending anteriorly for longer distances than superoinferiorly.

nal pattern. In Figure 9 an irregular star is seen on the internal surface with cracks in the lacquer extending downward and forward on the external surface. In this specimen there is also a contrecoup deformation of the left lateral frontal region, with cracks appearing only on the external surface suggesting an outbending of the skull in this region. In Figure 10, the pattern following a posterior parietal blow near the midline is shown. On the external surface of the skull, a few cracks extending downward and forward are seen. On the internal surface, a well formed star pattern is shown. The external cracks begin where the lines of the internal pattern end.

Midline posterior interparietal blow. On the external surface no patterns are noted, but on the internal surface a star pattern is seen (Fig. 11).

Blow on lambdoid suture neighborhood halfway between midline and mastoid. In Figure 12 the pattern of a posterior parietal blow near the lambdoid suture is shown. On the external surface of the skull cracks in the lacquer extend down toward the base and the mastoid region. A few cracks appear in the anterior temporal region near the frontozygomatic junction on both sides. On the internal surface a star pattern is noted. The external lines in the lacquer begin where the cracks of the internal star pattern end. In Figure 13 an extensive star is noted on the internal surface of the skull again showing greater length in the anteroposterior direction than superoin-

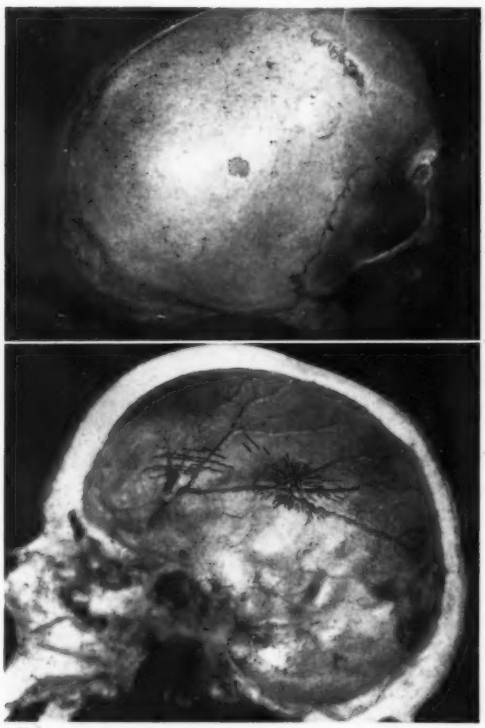

Fig. 7. Right lateral parietal blow. This thick skull shows no cracks in the lacquer on its external surface. On the internal surface of the skull, in the lower photograph, the usual star is again seen, with anterior extensions much more widespread than superoinferiorly.

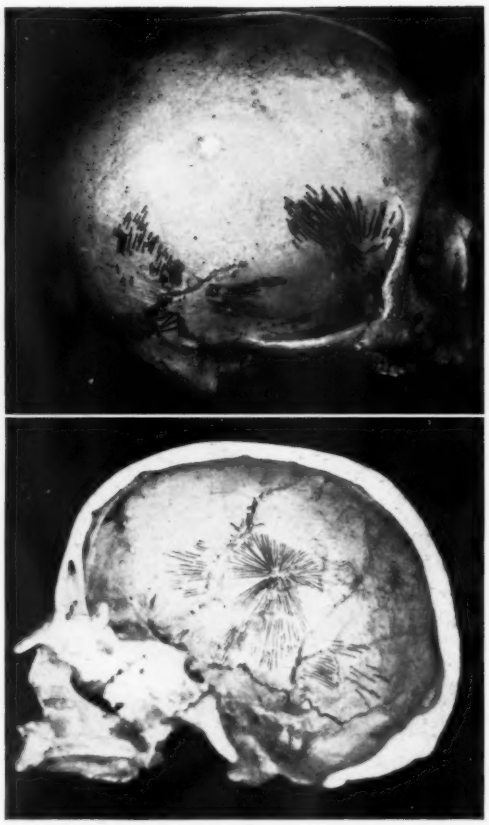

Fig. 8. Right lateral parietal blow. On the external surface the point of impact is surrounded by an area devoid of cracks in the lacquer. This corresponds to the star pattern on the internal surface of the skull. Outbending strains are at least in three directions. Forward they are obliquely in the superoinferior direction; below, they are in the superior inferior direction; and behind, in the anterior posterior direction. The internal pattern is cut short superiorly due to the curving of the skull.

feriorly. On the external surface cracks appear in the lacquer extending toward the base of the skull on the right side, lateral to the foramen magnum.

Midline occipital blow near lambdoid suture. In Figure 14 the blow was somewhat to the right of the midline with a beautiful star pattern on the internal surface of the skull, limited on the medial and inferior portions by the midline occipital buttress. On the external surface of the skull there are some cracks extending toward the mastoid and others extending toward the foramen magnum. In Figure 15 a nice pattern is noted on the internal surface with irregularity in contour, and this pattern fits almost exactly the area of the skull on the external surface not showing any cracks in the lacquer. The point of impact is surrounded by masses of cracks anteriorly, laterally and posteriorly in such a manner as to suggest a most interesting pattern of deformation of an undulating type governed in part by buttresses and variations in thickness. In Figure 19 the red lines represent the internal pattern and the black lines the external cracks in the lacquer. Note the way the internal and external patterns dovetail.

Fig. 9. Right posterior parietal blow. This set of photographs is included in order to emphasize the contrecoup pattern seen in the skull to the right. The cracks in the lacquer appeared only on the external surface of the skull and they occur just superior and posterior to the zygomaticofrontal junction. The upper photograph to the left shows a pattern on the internal surface of the skull of an irregular star with anterior extensions several times longer than the cracks superoinferiorly. In the lower left, there is extensive deformation pattern evidenced by cracks in the lacquer extending downward and forward.

DISCUSSION

It should be re-emphasized that this method shows only tensile strain patterns (tearing apart). Compression strains (pushing together) cannot be visualized in these studies. However, when both external and internal surfaces of the skull are available for study, bending activity can be determined. Bending produces tension on one surface and compression on the other. Thus, in a region where cracks are found on one surface of the skull and not on the other, bending has occurred as indicated by the position of the cracks. Cracks on the external surface of the skull indicate outbending, while cracks on the internal surface indicate a region of inbending.

Following a deceleration impact there is an area of inbending, the limits of which are governed by the radius of curvature of the skull in the region of impact. At times, this area of inbending is of irregular outline due to irregularities of thickness, presence of buttresses, and other factors such as emissary foramina and diploic channels of unusual ex-

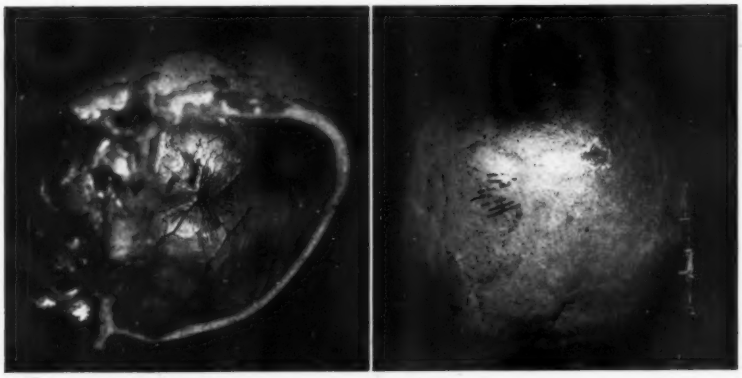

Fig. 10. Posterior parietal blow. On the external surface, there are cracks extending downward and forward toward the temple. On the internal surface a beautiful star pattern is seen. The external cracks begin where the internal cracks end.

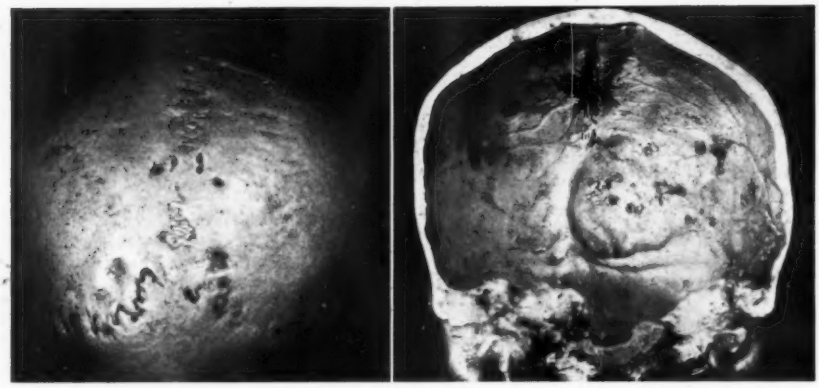

Fig. 11. An interparietal blow at the midline near the lambdoid suture. To the left the photograph shows no pattern on the external surface of the skull. To the right the photograph shows a star pattern on the internal surface of the skull somewhat interrupted by the midline buttress.

tent. Peripheral to the area of inbending the bone bends out simultaneously in certain selected areas, and this occurs in the same and other specimens in repeated tests. The pattern suggests undulating type of movement with simultaneous inbending in the region of impact and outbending beginning at the border of the area of inbending. In Figure 17 the red lines are those of the internal pattern and the black lines constitute the patterns seen on the external surface of the skull. It is apparent that inbending takes place in the region of the red lines while outbending occurs in the area of black lines. The undulating characteristics of the deformation pattern thus can be visualized. In Figure 19 note that the inbending, or red line pattern, is of irregular outline, suggesting an asymmetrical area of inbending peripheral to which discreet areas of outbending can be seen. The strain is anteroposteriorward in the parieto-occipital areas of both sides, from side to side anterior to the area of impact, and in the squamous portion of the occipital bone. Thus, the outbending of the skull may be in different planes in various regions after a single impact. This is in part governed by buttresses, contiguous thick and thin areas of bone, and the shape of the injuring object.

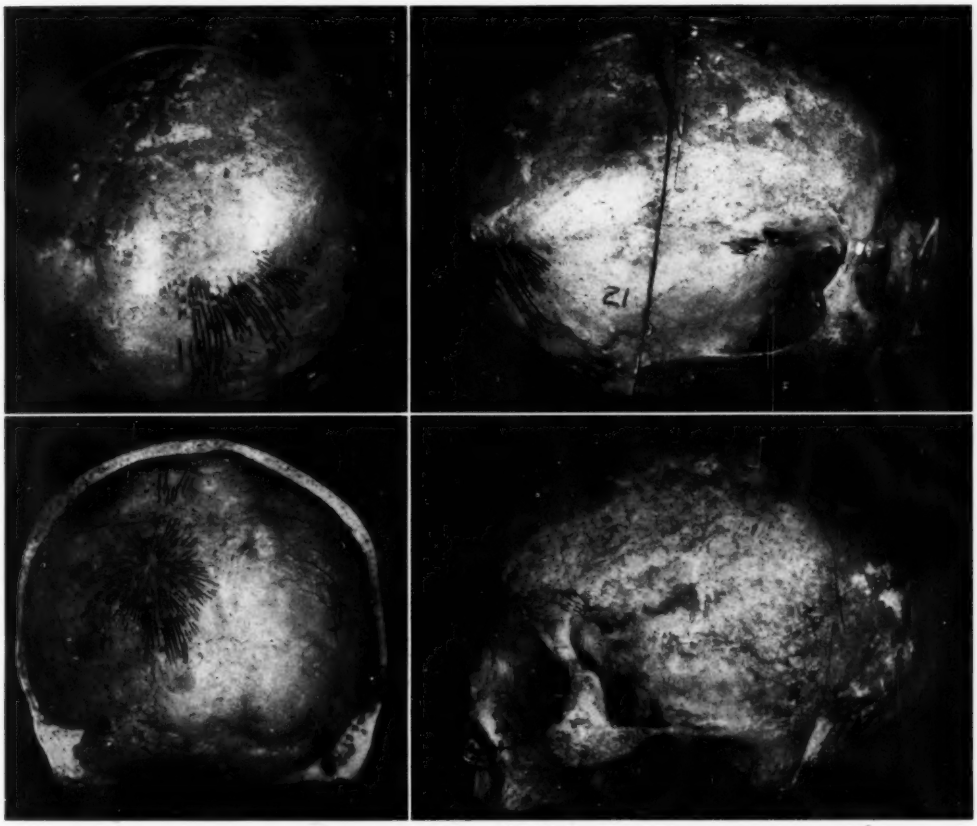

Fig. 12. Posterior parietal blow near the lambdoid suture. In the upper left, cracks extend laterally and toward the base. In the lower left, the internal pattern is shown. Again the external pattern begins where the internal pattern ends. The right upper and lower photographs show some cracks in the lacquer near the frontozygomatic junction on both sides.

In deceleration blows the pattern seen on the internal surface of the skull is of the same type in almost every instance. One sees a star with cracks in the lacquer arranged radially and extending away from the area of impact. In general, the cracks in the star extend farther posteriorly and anteriorly than superiorly and inferiorly since the radius of curvature in the first instance is much greater, and the skull is found to curve much more rapidly in the superior-inferior direction. The star pattern suggests an inbending with strains most concentrated in the region of impact. It appears from the pattern and the type of deformation that shear forces act between the two layers of the skull and may cause a sliding action between the outer and the inner table. If the blow is sufficiently severe and localized, an area of actual depression may occur, and as the bone fails resulting in depression, a tearing apart of the inner and outer tables of the skull may take place. In some cases, with depression, fragmentation of the bone in the area of deformed bone may be governed by the inbending pattern seen on the internal surface of the skull.

The internal pattern does not disclose a characteristic path of strain in any given direction; it rather points to the fact that due to the inbending of bone the strain extends

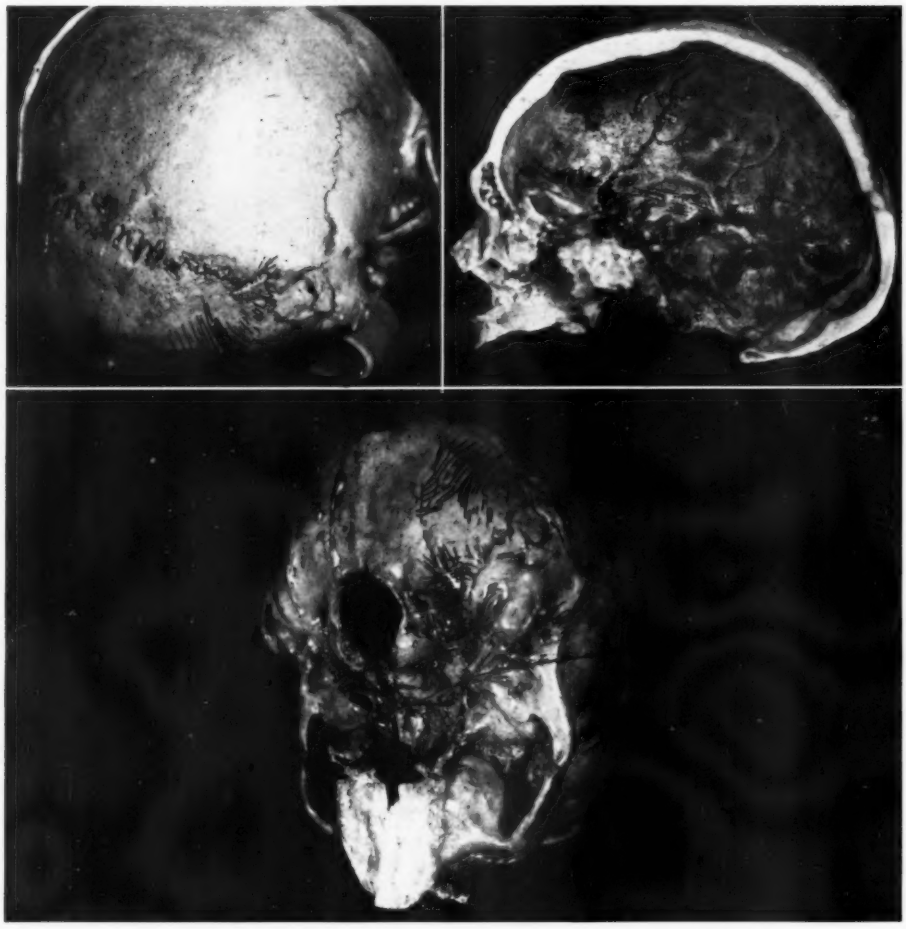

Fig. 13. Parieto-occipital blow midway between midline and mastoid and on the lambdoid suture. The upper left shows a series of cracks extending down toward the base of the skull also seen in the lower photograph. The cracks divide into one group curving medially and another extending forward toward the base. Still other cracks are noted just lateral to the condyloid process of the occipital bone. In the upper right photograph, the pattern seen on the internal surface of the skull is shown.

radially from the point of impact, only limited by the radius of curvature and peculiar structural characteristics of the skull. In blows not severe enough or sufficiently localized to cause depression or perforation, the production of a linear fracture is governed by strains seen on the external surface of the skull. This suggests initiation of the fracture line away from the point of impact. After the crack forms it propagates in both directions, toward and away from the area of the blow. Its extension toward the area of the center of the impact can be explained by the fact that although the area of inbending on the outer surface of the skull is initially in compression, as the bone rebounds, tensile strains appear with the maximum values at the center. The propagation of the fracture line to this region of tensile strains is to be expected. The fracture reaches the center and usually does not extend further

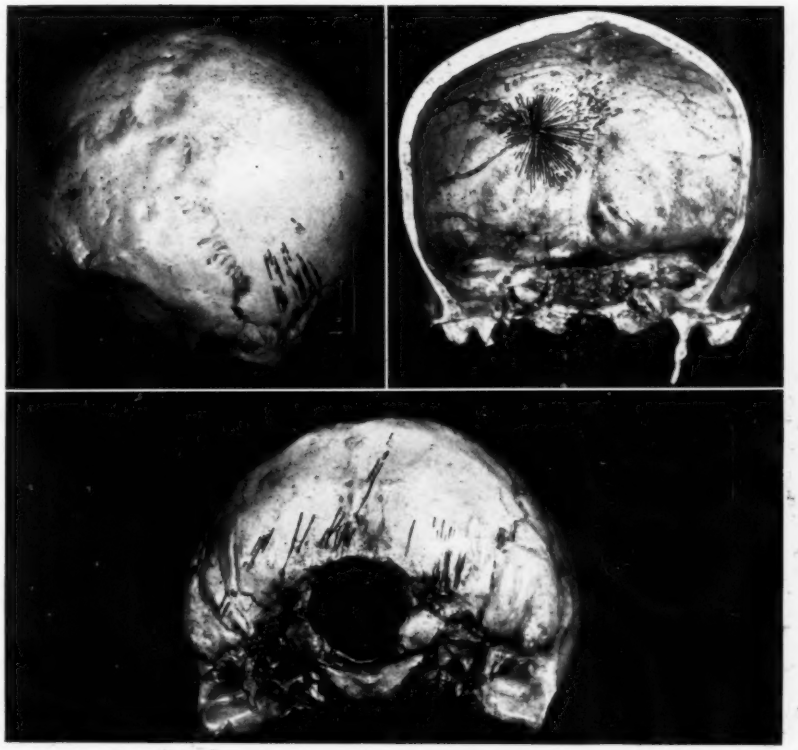

Fig. 14. Right occipitoparietal blow 2 inches from the midline and just superior to the lambdoid suture. In the upper left photograph, cracks are seen extending down toward the mastoid bone. In the upper right, a typical star pattern is noted. Superimposition of the internal and external group of cracks makes it evident that the external group start as the internal group end. In the lower figure there are several cracks extending toward the foramen magnum and a few crossing the midline obliquely.

because the tensile strain gradient decreases rapidly from the center outward. In certain positions, two lines of fracture may begin on either side of the skull uniting at the point of impact. It is difficult to explain the genesis of linear fracture from the internal star pattern since the propagation of the fracture line would extend in both directions from the center of the area of impact in every case, and reach as far as the border of the area of inbending. In some of the specimens studied a linear fracture did occur. This line frequently extended to the area of impact and in no instance was the line seen crossing the region of the blow. If the internal pattern were significant, relative to the causation of linear fractures, such a separation of bone should have been seen crossing the area of impact and limited to the pattern on the internal surface of the skull. It should be pointed out that the two-layer characteristic of the skull through the greater portion of the vertex suggests that in the inner table a greater degree of deformation without fracture can occur because it is much thinner than the outer table of the skull. It is, of course, admitted that shear forces occur between the two tables at impact.

Thus far blows with a hammer having a face of one inch in diameter and deceleration blows on a flat steel plate have been studied. With the hammer the area of contact is smaller, hence a smaller area of inbending takes

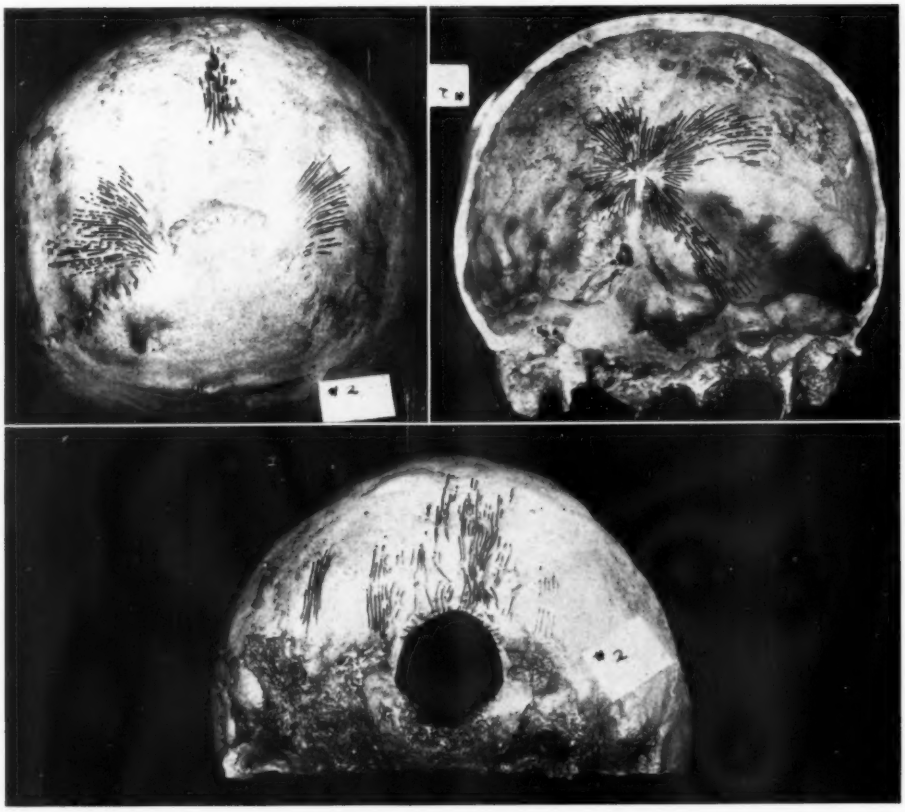

Fig. 15. Midline occipital blow at the lambdoid suture. In the upper left, three groups of cracks are noted, two laterally, one anteriorly. On the internal surface of the skull, in the photograph in the upper right, is seen an irregular star which fits in the space between the external group of cracks. In the lower photograph, cracks in the lacquer extend toward the foramen magnum and lateral to the same (see Fig. 19).

place. With deceleration blows a larger area is contacted with a more extensive inbending. However, in both groups of experiments the general pattern of tensile strains is the same. More work is contemplated with blows on convex and concave surfaces.

The work with the "stresscoat" points to the following explanation of linear fracture. The area of impact is inbended with simultaneous outbending of some of the surrounding area of bone. This outbending is selective and occurs more readily in some places than others. The pattern of cracks in the lacquer resulting from the outbending parallels most fracture lines seen clinically. The "stresscoat" work suggests that many linear fractures are initiated at a distance from the point of impact extending toward the point of impact and in the opposite direction. Some fractures may appear on either side of the area of impact simultaneously and meet at the point of impact. Two fracture lines may be initiated in different parts of the skull and extend toward the area of impact.

It is recognized that in these studies blows are administered to a single area on the skull, whereas in ordinary deceleration injuries such as in automobile accidents, multiple blows may occur practically simultaneously, changing the resultant patterns appreciably. How-

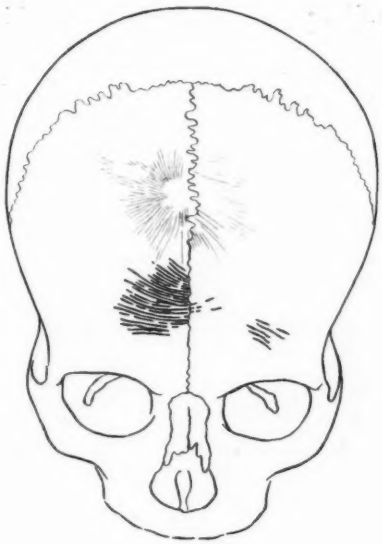

Fig. 16.

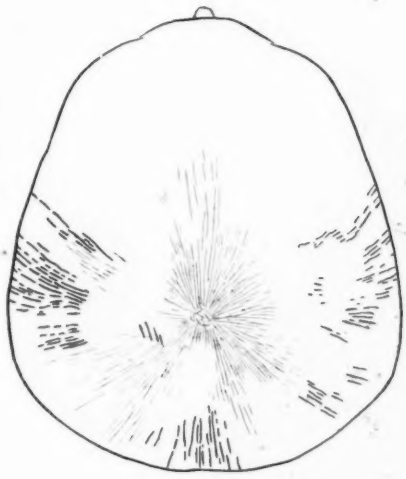

Fig. 18.

Fig. 17.

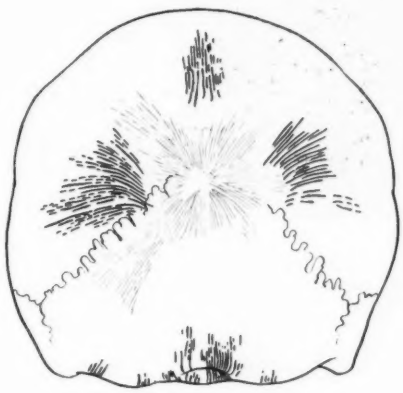

Fig. 19.

Fig. 16. Midfrontal blow with internal pattern shown in red and external pattern in black. Note that inbending about the point of impact is surrounded by an irregular outbending of the skull. The outbending is superoinferiorly in the right forehead region and obliquely superoinferiorly and about at right angles with the first described outbending in the left forehead region.

Fig. 17. The red lines indicate the internal and the black lines the external patterns after a lateral frontal blow, as seen in Figure 4. Note that the outbending of the skull is mainly in the anteroposterior direction. Note also that the internal pattern is more extensive in the anteroposterior direction due to the greater radius of curvature of the skull in this plane.

Fig. 18. Composite representation of internal and external patterns shown in Figure 5. The red, or the internal, and the black, or the external, cracks dovetail with each other. Note that after an asymmetrical inbending about the area of impact there are areas of outbending with strains anteroposteriorly on the lateral aspect and from side to side in the pattern posterior to the area of inbending.

Fig. 19. This is a composite representation of the internal and external patterns as seen in Figure 15. Note that the strain is from side to side in the anterior and basal group of black lines, and anteroposteriorly in the lateral group of black lines. Note the irregular bordered internal pattern of red lines that fit in the space left vacant between the outbending patterns on the external surface.

ever, the effect of multiple blows can be visualized by the superimposition of patterns obtained from single blows.

CONCLUSIONS

1. Many linear fractures result from outbending of the skull and they are initiated away from the point of impact.

2. Many linear fractures are initiated on the outer layer of the skull by tensile (tearing apart) strains.

3. From the position of the area of impact the direction of the resultant fracture line may be surmised.

4. From the position of the fracture line the area of impact causing the injury may be surmised.

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THE STABILITY OF THROMBIN, PENICILLIN, OR STREPTOMYCIN, IN THE PRESENCE OF GELATIN SPONGE, OXIDIZED CELLULOSE OR EACH OTHER

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THERE is an increasing interest in the biologically absorbable matrices such as absorbable gelatin sponge (2) and oxidized cellulose (8, 10). Potent concentrates of the blood clotting enzyme thrombin have been used in conjunction with these substances to enhance hemostasis. That such surgical adjutants might also be impregnated with certain of the antibiotics and implanted in wound areas to give desirable local or even prolonged systemic concentrations presents an intriguing possibility.

Seegers and Doub have reported that thrombin is destroyed by oxidized cotton within a few minutes due to the acidic nature of the fibers; when the cotton was treated with a solution of bicarbonate it lost its destructiveness to thrombin. The purpose of this paper is to report investigations concerning the effect of gelatin sponge and oxidized cellulose on solutions of thrombin, penicillin, or streptomycin; also data on the stability of thrombin and penicillin, and thrombin and streptomycin when this enzyme is in solution with each antibiotic.

THROMBIN IN THE PRESENCE OF GELATIN SPONGE (GELFOAM) OR OXIDIZED CELLULOSE

The bovine thrombin used was prepared in our laboratory essentially according to the method of Astrup and Darling. Sufficient powdered thrombin was dissolved in 20 cubic centimeters of distilled water to yield a solution with an initial clotting potency of 500 units per cubic centimeter when assayed with pooled plasma (6). This original solution had a *p*H of 6.6.

A 100 milligram gelatin pad was wet and mixed intimately with 10 cubic centimeters of the above thrombin solution; the solution *p*H then measured 6.0. With the sponge in it the aliquot was allowed to stand under laboratory conditions and was assayed at intervals for thrombin potency (Table I).

In a similar manner a 100 milligram piece of oxidized gauze was mixed with the remaining 10 cubic centimeters of thrombin solution (*p*H became 3.7) and intermittent assays for clotting potency obtained as indicated in Table I.

The unneutralized oxidized gauze was immediately destructive to the enzyme activity; this is in agreement with data previously reported (7). Gelatin sponges were found to have no effect on the thrombin concentration.

PENICILLIN IN THE PRESENCE OF GELATIN SPONGE OR OXIDIZED CELLULOSE

For these investigations penicillin (calcium salt) was dissolved in a liter of distilled water to give a solution having 300 micrograms per cubic centimeter with a *p*H of 6.5. A 200 cubic centimeter aliquot of this was set aside as a control (solution A, Table II). All solutions were held under laboratory conditions and penicillin determinations made at stated times by a chemical assay technique (3).

A pad of absorbable gelatin weighing approximately 1 gram was wetted and suspended in a 200 cubic centimeter volume of the mother

TABLE I.—EFFECT OF GELATIN SPONGE AND OXIDIZED CELLULOSE ON THROMBIN POTENCY

Time	Gelatin sponge in thrombin solution thrombin	Oxidized cellulose in thrombin solution thrombin
	(Units/c.c.)	(Units/c.c.)
Initial potency	500	500
5 minutes	500	<100
20 minutes	500	0
45 minutes	—	0
1 hour	500	0
2 hours	500	—

From The Research Laboratories of The Upjohn Company.

TABLE II.—EFFECT OF GELATIN SPONGE AND OXIDIZED CELLULOSE ON PENICILLIN POTENCY

Time	A	B	C	D
	Penicillin solution (control) penicillin	Gelatin sponge in penicillin solution penicillin	Oxidized cellulose in penicillin solution penicillin	Penicillin solution buffered to *p*H = 3.0 penicillin
	(micrograms /c.c.)	(micrograms /c.c.)	(micrograms /c.c.)	(micrograms /c.c.)
Initial potency	300	300	300	300
2 hours	300	250	75	71
5 hours	290	242	44	57
7 hours	280	238	38	52

liquor (solution B, Table II); *p*H of this solution became 6.2. Penicillin concentrations were ascertained and recorded (Table II).

To another 200 cubic centimeter portion was introduced a pad of oxidized gauze weighing approximately a gram (solution C, Table II). The acidic nature of the gauze lowered the *p*H of the penicillin solution to 3.1.

Loss of thrombin activity in the presence of oxidized cellulose has been shown (7) to be due to the acidity which cellulosic acid imparts to the solution. With this in mind the final 200 cubic centimeter aliquot of the original penicillin solution was adjusted to a *p*H of 3.0 (solution D, Table II), or to the same acidity as that of the oxidized gauze treated solution, and penicillin activity followed.

Typical results for such studies are revealed in Table II. Gelatin sponges were relatively innocuous to the penicillin; there appears to be in the first 2 hours a loss of about 20 per cent of the antibiotic activity with very little subsequent loss throughout the experimental period. The oxidized cellulose destroyed nearly 90 per cent of the total penicillin, with 75 per cent being destroyed in the first 2 hours. Penicillin solutions that had been buffered to an acidity corresponding to that produced by the gauze demonstrated similar loss of potency. This would indicate that the deleterious action of the oxidized cellulose could be ascribed to its inherent acidity.

STREPTOMYCIN IN THE PRESENCE OF GELATIN SPONGE OR OXIDIZED CELLULOSE

For these studies distilled water solutions of streptomycin (sulfate) were so prepared

TABLE III.—EFFECT OF GELATIN SPONGE AND OXIDIZED CELLULOSE ON STREPTOMYCIN POTENCY

Time	A	B	C	D
	Streptomycin solution (control) Streptomycin	Gelatin sponge in streptomycin solution streptomycin	Oxidized cellulose in streptomycin solution streptomycin	Streptomycin solution buffered to *p*H = 3.0 streptomycin
	(micrograms /c.c.)	(micrograms /c.c.)	(micrograms /c.c.)	(micrograms /c.c.)
Initial potency	11,000	11,000	11,000	11,000
2 hours	10,700	11,000	10,400	10,800
24 hours	11,900	11,200	10,800	11,900
10 days	11,200	11,000	10,300	11,500

that each cubic centimeter contained about 11,000 micrograms of pure streptomycin base. All solutions were kept under laboratory conditions throughout the entire period of study. Streptomycin assays were made as described by the Food and Drug Administration (5).

As listed in Table III: A was a water solution (*p*H = 5.5) of the drug only, as a control. B (*p*H = 5.4) was 35 cubic centimeters of streptomycin solution to which a 200 milligram sponge of absorbable gelatin was added. C (*p*H = 2.6) was the same volume of streptomycin solution with a 200 milligram piece of oxidized cellulose in it. D was the antibiotic solution alone buffered to a *p*H of 3.0.

Streptomycin in solution was stable (Table III) under all the conditions to which it was subjected in these studies for as long as 10 days.

THROMBIN AND PENICILLIN ACTIVITIES WHEN THE TWO ARE IN MUTUAL SOLUTION

Thrombin is used clinically, often in conjunction with an absorbable matrix, to enhance or assure hemostasis. The desirability of using bacteriostatic substances in wound treatment suggested that perhaps when thrombin was employed to stay hemorrhage it would often be rational to put the clotting enzyme in solution with the bacteriostatic agent of choice to permit simultaneous application. Information was needed as to the compatability of thrombin and such substances. The study presented here and the following one are the results of our experiences with two of the antibiotics.

TABLE IV.—STABILITY OF THROMBIN AND PENICILLIN WHEN IN MUTUAL SOLUTION

Time	Thrombin (units/c.c.)	Penicillin (units/c.c.)
Initial potency	200	1,000
1 hour	200	1,160
2 hours	175	920
3 hours	180	960
7 hours	190	1,040

Thrombin and penicillin materials used were the same as identified in the previous studies, as was also the technique for thrombin assay. Penicillin was determined by the cylinder plate method (4) with dilutions made in buffer of $p_H = 6.0$.

A distilled water solution of penicillin was prepared to have a concentration of 1,000 Oxford units per cubic centimeter. Powdered thrombin was dissolved in this solution to give a clotting potency of 200 units per cubic centimeter. The mixture was held at room temperature and assayed as indicated (Table IV) for each constituent.

Within the errors of the assay techniques neither thrombin nor penicillin showed any loss of potency when in mutual water solution for over 7 hours.

THROMBIN AND STREPTOMYCIN ACTIVITIES WHEN THE TWO ARE IN MUTUAL SOLUTION

Experiments similar to those reported for penicillin have been carried out with streptomycin.

Streptomycin (sulfate) was dissolved in distilled water to a concentration of 11,000 micrograms per cubic centimeter. This solution was used to reconstitute powdered thrombin to a clotting potency of 500 units per cubic centimeter. The mixture was held at room temperature and assayed for each entity by methods which have been mentioned (5, 6).

TABLE V.—STABILITY OF THROMBIN AND STREPTOMYCIN WHEN IN MUTUAL SOLUTION

Time	Thrombin (units/c.c.)	Streptomycin (micrograms/c.c.)
Initial potency	500	11,000
1 hour	500	—
2 hours	500	10,550
3 hours	500	—
7 hours	500	—
24 hours	500	10,100

Both the thrombin and streptomycin (Table V) retained their initial potency when in solution with each other.

SUMMARY

The enzyme, thrombin, and the antibiotic, penicillin, were both rapidly destroyed by oxidized cellulose. This is apparently due to the lowering of the p_H of such solutions by the gauze, for thrombin or penicillin were also unstable in solutions buffered to a p_H corresponding to that produced by pieces of oxidized cellulose.

Thrombin or penicillin showed no loss of potency from solutions in which absorbable gelatin sponges were suspended. The gelatin sponges did not significantly alter the inherent p_H of the solutions.

Streptomycin was stable in the presence of either gelatin sponge or oxidized cellulose.

When powdered thrombin concentrate (bovine) was reconstituted with an aqueous solution of penicillin or streptomycin all constituents were compatible as evidenced by no loss of enzymatic or antibiotic potency.

The possible combinations for studies of this type are numerous, particularly as concerns the use of the absorbable matrices with aqueous solutions of various substances. Some of these are being investigated. Preliminary data indicate that ascorbic acid, which has been reported (9) to be of interest in wound healing, shows little deterioration in the presence of gelatin sponge or oxidized cellulose.

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SUBPERITONEAL HEMORRHAGE FROM VITAMIN C DEFICIENCY SIMULATING ACUTE SURGICAL ABDOMINAL CONDITIONS

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THE frequency of atypical and even asymptomatic vitamin deficiencies is now well established. Routine vitamin C administration in postoperative states is based on our knowledge that scurvy may exist with or without characteristic symptoms, physical signs, or roentgenologic evidence. The typical symptoms attributed to classical scurvy are: hemorrhages, anemia, swollen and bleeding gums, and bone changes; however, these are not often encountered.

The diagnosis in the atypical or subclinical case is made by laboratory methods, signs of capillary fragility, and a careful analysis of food intake together with factors capable of inhibiting absorption, such as decreased utilization in hepatic disease, the increased secretion in lactation, the increased destruction by alkalies, and the increased requirements of metabolic disorders.[1]

Hemorrhage is one of the most significant and characteristic features of scurvy. This may be obvious as seen in bleeding gums, purpuric lesions, or hematuria. It may be less obvious if the bleeding is in the muscle, joint, or internal viscus. In the cases here reported, the hemorrhages were subperitoneal, and the manifestations were similar to those of acute surgical abdominal diseases. In various surgical monographs little or no consideration is given to the possibility of surgical mistakes on this basis, although cases of cryptogenic spontaneous hemorrhage of the abdominal walls have been reported.

CASE 1. R.E.F., a 17 year old male whose previous health had been good, was admitted to St. Joseph Hospital, November 1, 1945, about 5 hours after having been kicked in the abdomen by a teammate during a high school football scrimmage. Momentarily, he was stunned by the injury and was excused from practice. Thirty minutes later he vomited, and pain in the epigastrium increased steadily until 3 hours later it was described as unbearable. Examination revealed marked tenderness and rigidity in the upper half of the abdomen. The temperature reading showed 99 degrees F. There were no findings in the chest or upper respiratory tract. A blood examination showed 15,000 leucocytes, 92 per cent polymorphonuclears, hemoglobin 14.0 grams, and the erythrocyte count was 5,050,000. An x-ray examination of the abdomen revealed no free air or "laddering" of the intestines.

A laparotomy was performed by Dr. Bertram Fitzgerald 6 hours after the onset, because rupture of an abdominal viscus was suspected. When the peritoneum was opened there was no air or excessive fluid present. The liver and spleen were normal. When the common mesentery was exposed, an enormous number of ecchymotic and petechial hemorrhages covered almost the entire mesentery. A few were scattered over the anterior surfaces of the cecum, ileum, and jejunum. No additional pathology was discovered, and, after all viscera had been inspected for perforation, the abdomen was closed.

Partial atelectasis of the right lung on the second postoperative day produced some dyspnea and slight fever (102 degrees F. as the maximum) but otherwise convalescence was uneventful.

On the day following surgery blood studies revealed: prothrombin time 26 seconds (normal 21 seconds) clotting time, 3½ minutes; bleeding time, 1½ minutes; platelet count about 300,000 per cubic millimeter; ascorbic acid level on whole blood plasma, 0.3 milligram.

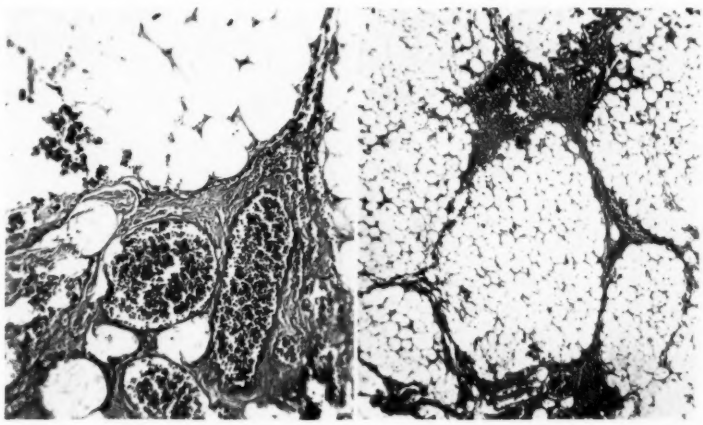
A capillary fragility test with the blood pressure at 80 millimeters of mercury for 5 minutes showed numerous petechiae. Further questioning revealed that the patient's diet was inadequate. He rarely ate raw fruit, vegetables, salads, or fruit juices. He ate excessive amounts of sweet foods and moderate amounts of meat and milk.

The postoperative care consisted of an appropriate diet and 500 milligrams of ascorbic acid parenterally daily. At the end of 10 days he was discharged in good health with the wound well healed.

CASE 2. H.M., a 45 year old white male, entered St. Joseph Hospital, May 11, 1946, complaining of a dull pain in the right lower quadrant of his abdomen which had developed suddenly 4 days previous to admission. There was no nausea or vomiting. A

From Departments of Medicine of St. Joseph Hospital and Northwestern University Medical School.

[1] Cayer, David. J.Am.M.Ass., 1946, 132: 558.



Figs. 1 and 2. Photomicrographs of tissue removed in Case 2. Note hemorrhage between the fat cells and marked hyperemia of blood vessels.

physician in a Boston hotel diagnosed the case as acute appendicitis, but the patient refused surgery and returned to his home in Chicago.

Physical examination revealed an apprehensive man whose blood pressure readings were 160 systolic and 90 diastolic, tenderness, rigidity, and a suggestion of a mass in the right lower quadrant near McBurney's point, temperature 99 degrees F, and a leucocyte count of 11,350. A diagnosis of appendicitis was made. When the peritoneum was exposed, a thick indurated mass was encountered. This was the greater omentum adherent to the anterior parietal peritoneum. The parietal subserosa at the site was extensively infiltrated with hemorrhage, and the omentum was thick and purple. A cut section through the removed omental mass revealed firm fatty tissue, 8 by 3 by 1 centimeter with a large area of hemorrhage about 4 centimeters across, and scattered small petechiae.

Microscopic sections revealed fatty tissue with hemorrhage between fat cells and marked hyperemia of the blood vessels (Figs. 1 and 2).

Studies the day after surgery revealed the ascorbic acid level 0.6, normal bleeding time, normal clotting time, normal platelet count, and normal prothrombin time. The capillary fragility test was strongly positive.

Subsequent questioning revealed that he took from four to ten drinks of whiskey each day, and seldom ate citrus fruits or vegetables.

CASE 3. Mrs. K.L., a 30 year old white woman, was admitted to St. Joseph Hospital August 12, 1946, complaining of severe abdominal pain which began suddenly about 5 hours previous to admission and was soon followed by vomiting. Physical examination revealed extreme tenderness and board-like rigidity of the abdomen with only occasional peristaltic sounds. Bowel obstruction or perforation of the viscus was suspected, but since ordinary percussion of the chest and palpation of the muscles of the back and extremities revealed almost as much tenderness as was present in the abdomen, and because of the lack of leucocytosis (8000) and fever, surgical exploration was postponed.

Twenty-four hours later carpopedal spasm with a positive Trousseau's sign and a positive Chvostek's sign was demonstrated, and caused us to interpret the muscle pain as a spasm of tetany. Later the husband revealed a long history of alcoholism, and a recent debauch in which no food had been taken for several days.

Blood findings: fatty turbid serum, nonprotein nitrogen, 29 milligrams; glucose, 106 milligrams; chlorides, 510; vitamin C level, 0.28; inorganic phosphorous, 1.8; calcium, 6.5; amylase, 112 per cent; total protein, 5.4 with 3.3 albumin and 2.1 globulin; cholesterol, 144. The low vitamin C level, low calcium, low phosphorous, low total proteins, and the presence of fatty serum was interpreted as evidence of nutritional and vitamin deficiency. Intravenous calcium quickly controlled the muscle pain and spasm, and on a high protein regimen (supplemented by plasma), high vitamins, large doses of vitamin C parenterally, together with vitamin B complex, and liver extract, she improved promptly, and left the hospital with normal blood findings.

SUMMARY

Three cases with symptoms pointing to an acute surgical disease of the abdomen showed laboratory evidence and clinical signs of scurvy. Two patients were subjected to surgery and hemorrhage was shown to be the basis of the peritoneal irritation.

The third patient, not subjected to surgery, had tetany as well as scurvy. The tetanic

spasms of the abdominal muscles probably accounted in part for the picture of an acute surgical condition. However, in this case hemorrhage from scurvy may also have been present.

All the patients gave a history of a diet deficient in vitamin C. Two of the patients were discovered to be alcoholics, while trauma to the abdomen was the aggravating factor in one case.

CONCLUSION

In the clinical diagnosis of acute surgical diseases of the abdomen, spontaneous hemorrhages from nutritional deficiency or scurvy should be considered. Subclinical scurvy is recognized by consideration of the diet, by consideration of factors capable of inhibiting absorption of vitamin C, by physical signs of scurvy, by increased capillary fragility, and by determination of vitamin C levels in the blood.

A SIMPLE AND ASEPTIC METHOD OF ILEOCOLOSTOMY

Dr. J. TEN KATE, The Hague, Holland

IN shortcircuiting by lateral anastomosis between a proximal and a distal loop of intestine, the chief concern is always the prevention of contamination of the operative field. It is very difficult after the intestine is opened to include the mucosa of the colon in the suture in such a manner as to prevent completely contamination of the operative field. Fortunately, with the use of the newer antibiotics the danger of contamination is much less than formerly. Nevertheless, in patients debilitated by obstruction and intoxication, serious infection may ensue. In addition, the introduction of drains which many surgeons consider necessary in contaminated cases promotes a dehiscense of the suture line. For this reason, surgeons try by one means or another to carry out aseptic anastomoses. The clamp and the coagulation methods are especially well known. When the clamp method is used (Rankin, Stone) the suture is carried out over a specially constructed clamp which is removed at the last moment. Thus, the intestine is open only for a few seconds and at one place. According to Rankin, in not one of his patients did leakage occur at this stage. When the coagulation method is used the mucosa of the intestine is not opened but is thoroughly coagulated. As soon as the coagulated mucosa sloughs off, an open communication between the anastomosed loops is thus established. The difficulty with the coagulation method is to estimate the time necessary to assure that the sloughing off process is complete; we know of one case in which the ileus continued after this coagulation method had been used and death resulted.

Following is a description of a simple method which my former chief, the late Dr. Schoemaker, briefly mentioned in an address on colon surgery before the meeting of the *Société internationale de Chirurgie* at Cairo in 1935, and which was named by his assistants the "bird-cage" method. The advantage of this method is that an open communication is established immediately between the loops without the use of any specially constructed instrument. We have used the method in several cases and healing of the wound has always

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From the Department of Surgery of St. Antonius Hospital at Voorburg.

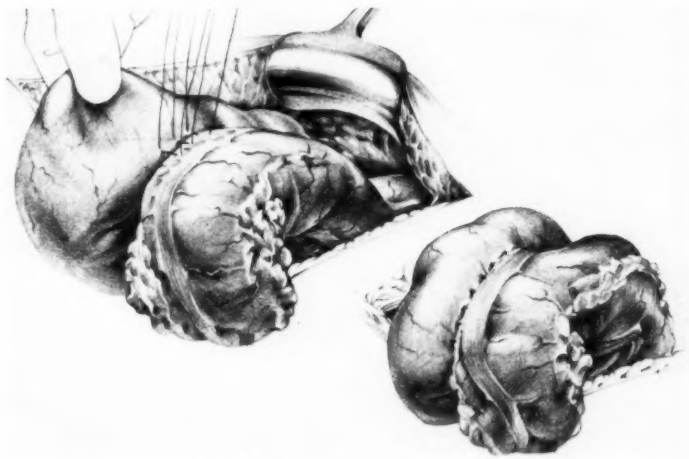

Fig. 1. Posterior seroserosal suture.

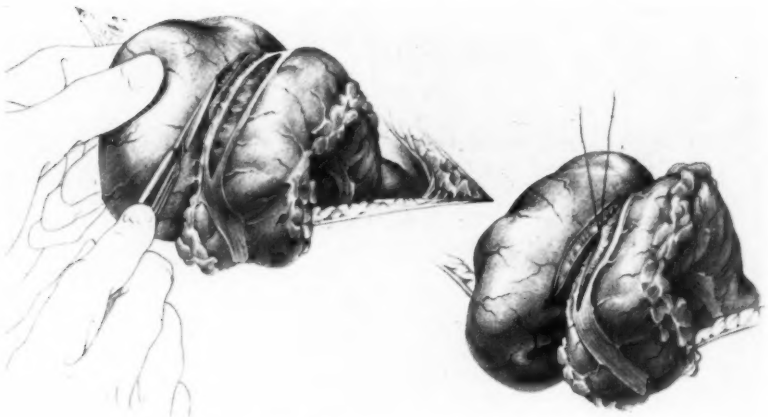

Fig. 2, left. Incision of the intestinal wall down to the mucosa.
Fig. 3. Suture of the posterior seromuscular flaps.

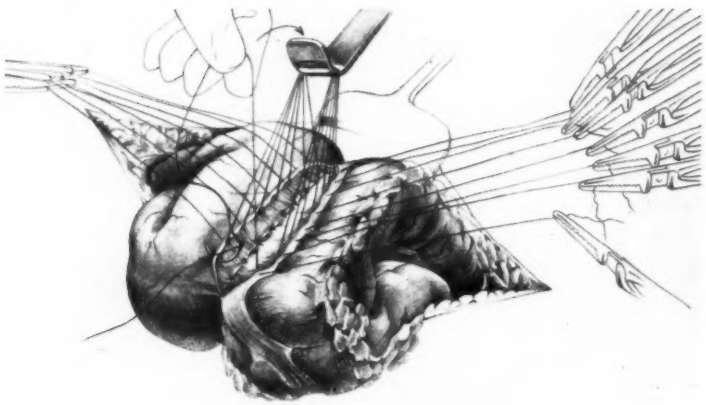

Fig. 4. Suture of the anterior seromuscular flaps with long threads the center part of which is elevated over a blunt hook.

progressed without complications and without drainage.

TECHNIQUE

The two segments to be joined are placed side by side for a certain distance, and a posterior (continuous) seroserosal suture is applied. The corner threads are fixed in a hemostat (omitted in Fig. 1). The intestinal wall is divided with a small, extremely sharp knife down to the mucosa, so that a sufficient oval of the mucosa lies bare. A second (continuous or interrupted) suture passes through the posterior seromuscular flaps of both segments and is tied and cut short at once (Fig. 3).

The loops are now joined on the posterior side by two sutures, one seroserosal and one seromuscular. Long interrupted sutures are placed through both anterior seromuscular flaps. The threads are all elevated and collected, midway, over a blunt hook or, if need be, a finger of the assistant, while both ends are held separately in hemostats (Fig. 4). When all the sutures have been inserted, the hemostats are replaced on each side by a strong intestinal

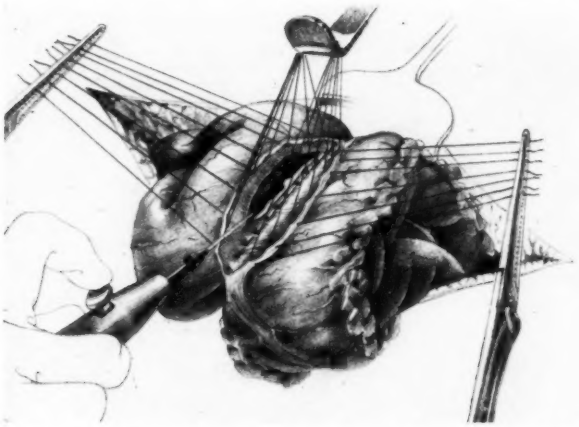

Fig. 5. Incision of the mucosa of both loops with a diathermy knife.

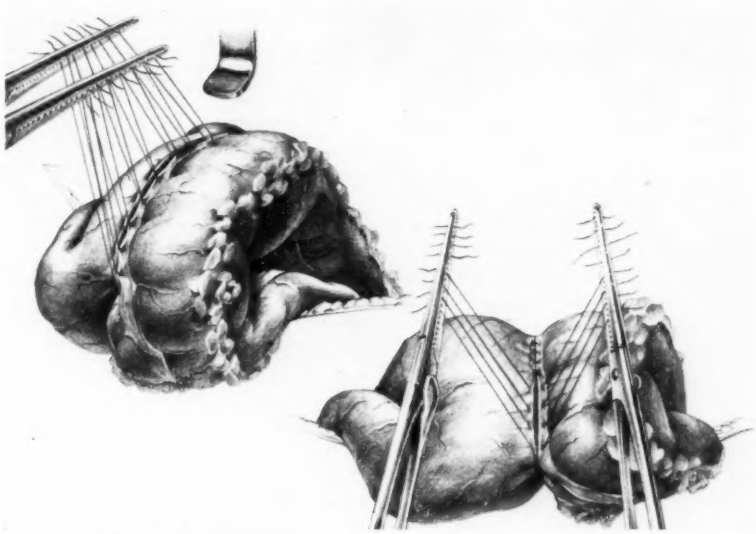

Fig. 6. Closure of the anastomosis by removal of the blunt hook and traction on the tensed threads in vertical direction.
Fig. 7. Tying of the anterior seromuscular sutures one by one.

clamp (Fig. 5). If the intestine is full, the segments may be milked empty and blocked off by applying clamps across the gut near the anastomosis. When the intestine is not unduly distended, the application of clamps can be dispensed with in most cases. While one assistant takes an intestinal clamp in each hand and pulls the threads taut and a second assistant or the surgical nurse elevates the center of the threads with a blunt hook, the operator divides the mucosa on both sides with a diathermy knife (Fig. 5). The second assistant removes the blunt hook and the first closes the anastomosis by traction in a vertical direction (Fig. 6). With good assistants the whole procedure takes but a few seconds.

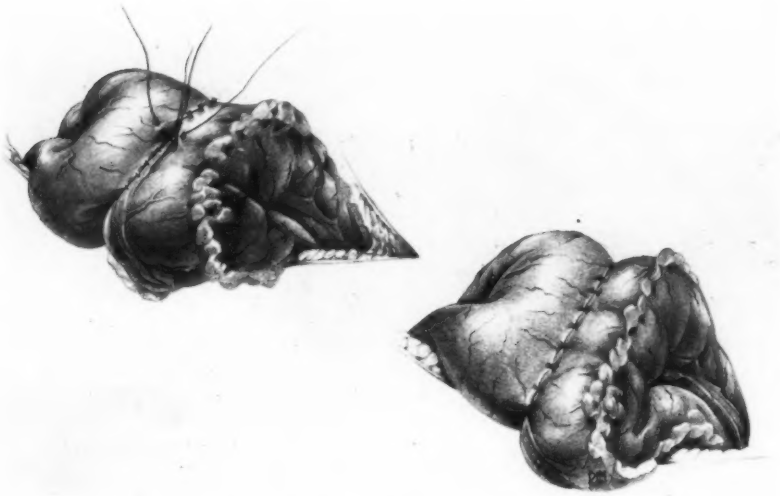

Fig. 8., left. Anterior seroserosal suture. Fig. 9. Anastomosis finished.

Sometimes the incised mucosa may bleed considerably, but that does not necessitate the ligation of the individual vessels for such a procedure would destroy the relative asepsis of this method. Although we have sometimes had copious, diffuse bleeding from the incised mucosa, we have never had serious complications from such bleeding. Besides, our experience with the Schoemaker closed method of end-to-end union of intestinal segments without suture of the mucosa had convinced us of the harmlessness of mucosal bleeding.

Precaution should be taken also to avoid dividing the sutures with the diathermy knife; therefore it is recommended that a relatively broad hook be used to hold the sutures so that access to the mucosa is facilitated.

While the assistant keeps the suture threads taut in a vertical direction, the operator cuts the threads one by one just under the clamps and ties them (Fig. 7). When the tying of all these sutures has been completed, then an anterior continuous seroserosal suture is applied and the anastomosis is finished (Figs. 8 and 9).

To prevent the formation of a diaphragm by agglutination of the nonsutured mucosa layers (which we found once as the cause of death in a case of obstruction after a circular resection) it is advisable after the anastomosis is finished to introduce the thumb and index finger on either side to break up any possible agglutination and to be certain that continuity has been restored.

LATE RESULTS OF URETEROENTEROSTOMY

GEORGE GILBERT SMITH, M.D., F.A.C.S., Providence, Rhode Island

ANASTOMOSIS of the ureters to the sigmoid is a procedure which could be of great value in urology if we could be reasonably sure that the results, over a period of years, would be satisfactory. This study is presented with the hope that it will shed some light upon this problem.

During the past 17 years—from 1930 to 1946, inclusive—the writer has done this operation in 66 patients; 50 of these had both ureters transplanted, in 16 only one ureter was so treated. The ureter which was not transplanted to the bowel was ligated in 6, transplanted to the skin in 8, not operated upon in 2. This makes a total of 116 ureters transplanted to the sigmoid.

The indications for ureteroenterostomy must be considered because the prognosis is much more favorable in some types of cases than in others. For example, the younger the patient, the better the outlook. Individuals with cancer are generally in the older groups and frequently their strength and their resistance to infection have been depleted. Some undoubtedly have a smouldering pyelonephritis, unrecognized before operation, which later becomes active.

In the series of patients here presented, the reason for ureteroenterostomy was radium burn of the bladder in 1, urinary incontinence in 2, submucous fibrosis in 4, exstrophy of the bladder in 6, vesicovaginal fistula in 6, and cancer of the bladder or of the bladder and urethra in 47. The radium burn of the bladder and one of the vesicovaginal fistulas were secondary to radiation treatment of cervical cancer. It is, I trust, unnecessary to say that in all of these patients, with the exception of those with malignancy, no solution of their difficulties other than transplantation of the ureters could be found.

The technique which was used in all but the last 6 cases was that known as Coffey One (1). This consists in severing the ureter 3 or 4 centimeters above the bladder and embedding the proximal segment in a trough in the wall of the sigmoid which has been made by dividing the serous and muscular coats of the latter for a distance of 4 centimeters. The floor of this trough is the intact mucosa of the bowel. A small incision through the mucosa is made at the lower end of the trough; the end of the proximal ureteral segment is drawn into the lumen of the bowel by a double suture, both ends of which are brought out through the intestinal wall 2 centimeters below the point of entrance of the ureter, and there tied. The edges of the divided muscularis and serosa are then sutured over the ureter. The anastomosis can be done intraperitoneally or extraperitoneally. Both methods were used in this series; neither appeared superior to the other.

In the last 6 cases, implantation of the ureter in the trough was carried out without opening the lumen of the bowel and without severing the ureter. At the second operation, approximately 2 weeks later, the ureter was divided 2 centimeters below its emergence from the trough and the proximal end was then led into the lumen of the bowel as in the Coffey One technique. The principle of embedding the ureter in the intestinal wall and allowing it to become healed in the canal before the lumen of the bowel or of the ureter was opened (Coffey Three) (2) was first advocated by Coffey. It has been employed by Higgins (3), who, as well as Coffey, produced a fistula between the ureter and the bowel either by a constricting stitch or by electrocoagulation. Jewett has varied this technique by producing the fistula by means of an electrosurgical incision made by a device introduced through the proximal end of the ureter, which had been divided below the point of emergence. The method followed by the writer and outlined above was first described by Winsbury-White; it was also used by Nesbit.

The introduction of the sulfa drugs and the antibiotics has been a great factor in preventing the calamities which sometimes attended

Presented before the Sectional Meeting, American College of Surgeons, Providence, March 28, 1947.

Fig. 1. Excretory urogram 12 years after bilateral ureteroenterostomy for submucous fibrosis. Nonprotein nitrogen 70 milligrams per cent.

Fig. 2. Ureteroenterostomy for exstrophy of bladder in 1930; left nephrectomy for stone in 1935; excretory urogram in 1941. Nonprotein nitrogen 43 milligrams per cent.

such operations before these aids to intestinal antisepsis were known. These agents have also been helpful in preventing the development of pyelonephritis during the postoperative period. Experience has taught us also that deep x-ray therapy to the pelvis, by causing fibrosis of the lower ureters, is sometimes responsible for sloughing of the transplanted ureter.

Of the 66 patients operated upon, 12 (18+%) died in the hospital. Autopsies were secured in all but one. Ten of these were operated upon for cancer of the bladder, 2 for irradiation necrosis of the bladder following radium and x-ray treatment of cancer of the cervix. The causes of death were: faulty healing of the anastomosis in 3, sepsis in 2, pyelonephritis in 2, embolism of the femoral artery in 1, thrombosis of the iliac vein, inferior vena cava, and left renal vein in 1, streptococcus infection following removal of a nonfunctioning kidney in 1. No cause was found in 1, coronary thrombosis in 1.

Seven of the above 12 patients had their bladders removed; 32 who had had cystectomy because of cancer and 5 because of exstrophy were discharged from the hospital.

Of the 54 patients who left the hospital alive, 8 died of renal failure, 5 in 1 year or less, 3 between 1 and 2 years. Four others had skin ureterostomies, 3 within 1 year, one 3 years after ureteroenterostomy. At least 4 of those who died should have had their kidneys drained. It is probable that several of these patients would now be alive if the ureters, or even if one ureter, had been brought out to the skin. Such a patient was operated upon in September, 1945. Left ureteroenterostomy was done, the right ureter ligated, and the bladder removed 2 weeks later. Three weeks after that, the right kidney was removed as it was functionless. The patient made a good recovery and

went South. In May, 1946, he returned and was seen by my associate, Dr. Leadbetter, during my absence. He found that the left kidney was not functioning well and advised ureterostomy. The patient did not follow this advice; he continued to fail and at the last moment, left nephrostomy was done. He died 4 months after being advised to have a ureterostomy. Autopsy showed a septic kidney; no cancer was found.

Fourteen patients died from recurrence of their bladder cancer. In 8 of these patients renal function appeared to be satisfactory.

Of the patients who are still living, 3 have unsatisfactory kidney function. A woman 54 years of age was operated upon in 1934 because of a vesicovaginal fistula which had resisted a number of attempts to repair it. In 1938 her left kidney was removed because of calculous pyonephrosis. Now, 9 years later, her right kidney is enlarged, her nonprotein nitrogen is 91 milligrams per cent, and her blood pressure is usually about 215/120. She is almost bedridden.

Another woman, aged 59 in 1934, had her ureters transplanted because of a severe submucous fibrosis. She had been well until lately but now is in a hospital with nonprotein nitrogen of 70 milligrams per cent. Her intravenous pyelograms made 3 months ago showed slight dilatation although both kidneys excreted diodrast (Fig. 1). She is now 74 and probably would not wish to have the ureters brought out to the skin.

A third patient, a young man of 19, had bilateral ureteroenterostomy for exstrophy of the bladder in 1930. In 1935, a left nephrectomy was done for calculous pyelonephritis. He came to the office a few weeks ago at my request as he had not been seen since 1941. At that time an intravenous pyelogram had shown considerable dilatation of the calices, pelvis, and upper ureter on the right; his nonprotein nitrogen was 43 milligrams per cent (Fig. 2). At this last visit, his nonprotein nitrogen had risen to 49 milligrams per cent and his blood pressure was 220/140. An intravenous pyelogram shows poor excretion of dye but much less dilatation (Fig. 3). In spite of this he is working as an accountant and considers himself in good health. It is doubtful whether surgical drainage of the kidney should be advised.

Fig. 3. Excretory urogram taken in 1947 of patient whose 1941 urogram is shown in Figure 2. Nonprotein nitrogen 49 milligrams per cent. Blood pressure 220/140.

Some surgeons prefer nephrostomy to ureterostomy. Our experience leads us to favor the latter because the operation is less severe and because the location of the drainage tube is more convenient for the patient. Neither method is ideal; in a series of 22 skin ureterostomies studied a few years ago there were 4 deaths from pyelonephritis occurring from 1 to 10 years after operation.

Among the 66 patients in the present series, there are living, in addition to the 6 patients whose ureters are not functioning satisfactorily, 18 whose renal function is reasonably adequate. The time elapsed since operation is: 1 year or less in 2, 1 to 2 years in 2, 2 to 3 years in 3, 3 to 4 years in 1, 4 to 5 years in 1, 6 to 7 years in 2, 8 to 9 years in 4, 10 to 11 years in 1, 11 to 12 years in 1, 12 to 13 years in 1.

One of these patients, a girl of 18 who was operated upon for exstrophy in 1936, delivered herself of a living child 3 years ago. She had no renal complications during or after her pregnancy although her left kidney showed diminished function in 1939. Her nonprotein nitrogen now is 31 milligrams per cent. Another girl, age 30 at the time of operation, had ureteroenterostomy for exstrophy of the bladder in 1936. Ten days after her left ureter was transplanted she developed pyelonephritis;

Fig. 4. Excretory urogram in boy of 12 one year after ureteroenterostomy for exstrophy of bladder.

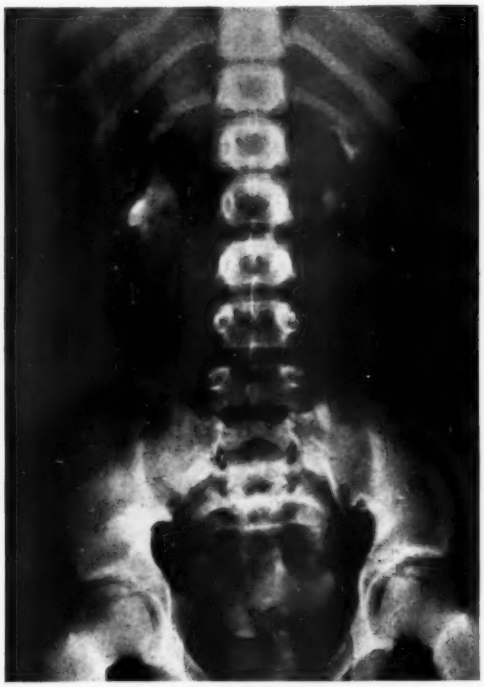

Fig. 5. Excretory urogram of patient in Figure 4 two years after operation. Note improved renal drainage.

the ureter was exposed and found to be indurated and acutely inflamed. It was opened with the escape of thick pus and a catheter was passed downward into the bowel where it was left for 10 days. The urine was drained by a temporary nephrostomy. The excretory urograms in 1943 showed slight dilatation of the right pelvis and ureter, very little dilatation, and good function on the left. Her nonprotein nitrogen was 16 milligrams per cent.

Six of the patients now alive had cystectomy for cancer; 5 of these have gone less than 3 years, one is well 7 years after operation. One has recurrence in the anterior vaginal wall;

TABLE I.—RESULTS ACCORDING TO DIAGNOSIS

Diagnosis	No.	Died in hospital	Died recurrence	Died other causes or of cause unknown	Died pyeloneph-ritis	Living (24) Renal function		Ureteros-tomies. (secondary)
						Satisfactory	Unsatisfac-tory	
Cancer bladder	47	10	14	6	8	6	0	3
Vesicovaginal fistula	5	0	0	0	0	3	1	1
Vesicovaginal fistula carcinoma cervix	1	1	0	0	0	0	0	0
Exstrophy	6	0	0	0	0	5	1	0
Submucous fibrosis	4	0	0	1	0	2	1	0
Incontinence	2	0	0	0	1	1	0	0
Radium necrosis bladder	1	1	0	0	0	0	0	0
	66	12	14	7	9	17	3	4

Fig. 6. Sixty minute excretory urogram 2 weeks after completion of both ureteroenterostomies.

Fig. 7. Thirty minute excretory urogram 2 weeks after completion of both ureteroenterostomies.

one is now convalescent; one at the end of 2 years and 2 at the end of 3 years are in excellent health. Another is alive after 2 years but has severe cardiac disease and is not in good health.

Tabulation of the patients according to diagnosis shows the marked difference in results between the patients in whom malignancy was not a factor and those in whom (Table I) the ureteral transplantation was done because of cancer of the bladder, or because of the results of radiation for cancer of the cervix. The 14 who died of recurrence added to the mortality in the malignant group. Fourteen others—29 per cent of the malignant group—died within 3 years of operation from renal complications or from causes which could not be determined. Nine (18%) of this group with cancer are now living, 3 with ureterostomies.

In contrast to the above results, among the 71 patients in the nonmalignant group one died of liver disease, one of pyelonephritis; 15 are living. Figures 4 and 5 show an excellent result following ureteroenterostomy in a child.

Of the total patients, 24 in number, who are living anywhere from a few months to 17 years since operation, 13 have been found by recent examination or have been stated by their doctors to have satisfactory renal function. Four others have had bilateral ureterostomies. Four are known to have poor function in one or in both kidneys. Three have not been checked recently but were well at last report.

In several of the patients with inadequate renal function, it has been found that there is very little dilatation of the renal pelvis now, although there had been considerable in the past. In one such case a nephrostomy was done; the kidney was contracted and scarred, the pelvis and upper ureter not at all dilated. Nephrostomy brought about marked improvement in the patient's condition within a few

Fig. 8. Twenty minute excretory urogram after the completion of the operative procedure of bilateral ureteroenterostomy.

Fig. 9. Twenty minute excretory urogram 3 years after operation. Nonprotein nitrogen 47 milligrams per cent. Same case as in Figure 8.

days; the elevated nonprotein nitrogen become normal. Bilateral skin ureterostomy was done a few months later, with excellent results. She has gained 35 pounds in weight, and feels better than she has felt in the past 12 years. Her nonprotein nitrogen, however, is now 48 milligrams per cent.

Review of this series of patients shows no immediate mortality in the nonmalignant cases, and in those with malignancy a hospital mortality of 18 per cent. This is not excessive in view of the prognosis without radical operation. The high incidence of death from recurrence (about 30%) argues for greater conservatism in the selection of cases for total cystectomy. It would have been better in certain of these patients with single infiltrating tumors to have electrocoagulated the tumor thoroughly through the open bladder. The cases best adapted to cystectomy are those patients with multiple, persistently recurring tumors of the lower grades of malignancy.

The real problem has to do with the preservation, over a long period of years, of the renal function. We do not know why some kidneys after ureteral transplantation remain normal for years, while others cease to function. Not infrequently one kidney will remain healthy although its fellow atrophies.

The two agents chiefly concerned in this problem are obstruction and infection. Unquestionably there is some factor involved in the transplantation which is responsible for the poor result, but it is usually unrecognizable by the surgeon at the time of operation. What is needed is a foolproof method of transplantation which, if done with reasonable skill, will guarantee results.

The method of transplanting the ureters in continuity, described earlier in this paper, may

possibly be the answer. The logic behind this technique lies in the fact that the ureter becomes healed in the intestinal wall before either lumen is opened; the likelihood of the ureter becoming encased in a plastic layer of inflammatory tissue is materially lessened. At the second operation, before implanting the severed ureter in the intestinal lumen, bougies may be passed up the ureter to demonstrate its patency.

The second stage may be difficult because of adhesions or inaccessibility of the anastomosis, but these factors can be foreseen and to a large degree prevented. The transverse incision, for example, gives much better access to the pelvic walls, and if the anastomosis is not made too low in the sigmoid, it will be more accessible. Five of the 6 cases in which this method was used by the writer have done well, so far as the ureteroenterostomy was concerned. These 5 had cancer of the bladder. The sixth patient died in 6 months, probably from pyelonephritis; he was operated on for incontinence (Fig. 6). Two have died, one at 5 months from coronary thrombosis, one at 9 months from recurrence of the carcinoma (Fig. 7). Both are reported to have had no urinary difficulty. Another was operated on only 3 months ago; the right ureter was transplanted by this method, the left by Coffey One technique, and it must be admitted that there is as much dilatation on the right as on the left. Another returned to the hospital 6 months after operation with fever and right upper quadrant pain; he was in acute cardiac decompensation; the nonprotein nitrogen was 158 milligrams per cent but fell rapidly to 52 milligrams per cent. His doctor 1½ years later said the patient had had no trouble with his kidneys since then.

The remaining patient, operated on over 3 years ago, was seen recently. Her nonprotein nitrogen was 47 but intravenous pyelograms showed a very satisfactory result. She feels perfectly well (Figs. 8 and 9).

In conclusion, let me say again that ureteroenterostomy is a procedure of the greatest value. The results in patients with cancer have been far from satisfactory; of 49 patients, only 9 (18%) have survived, and only 1 of these has gone over 3 years. In nonmalignant cases, the results have been much better, but the late development of renal failure in some patients has been discouraging. It is to be hoped that new and better techniques for the anastomosis of the ureter to the bowel will be forthcoming. In the meantime, we must stand ready to establish better drainage, by ureterostomy or nephrostomy, for those kidneys which are not functioning satisfactorily after ureteroenterostomy.

SUMMARY

1. The results of ureteroenterostomy in 66 patients operated upon in the period 1930 to 1946 are tabulated.

2. In 47 patients with cancer of the bladder and 2 with treated cancer of the cervix there were 12 hospital deaths and 14 deaths from recurrence of the cancer. Eight died, after discharge from the hospital, of pyelonephritis.

3. In 17 patients operated upon for nonmalignant conditions, there were no hospital deaths and only 1 death later from pyelonephritis.

4. Of 24 patients now alive, 17 have satisfactory renal function, 3 show signs of renal failure, 4 have required skin ureterostomies.

5. In at least 4 of the patients who died of pyelonephritis, renal drainage by ureterostomy or nephrostomy would probably have materially prolonged life.

6. In patients who have had ureteroenterostomy, the renal function should be followed by determination of nonprotein nitrogen and by excretory urograms at least once a year. If the kidneys show evidence of progressive failure, nephrostomy or ureterostomy should be done.

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EDITORIALS

SURGERY
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AUGUST, 1947

SURGERY OF THE ENDOCRINE GLANDS

OUR surgical experience with lesions producing metabolic disturbances has greatly increased the past few decades. In addition, extensive investigative work has been carried out in this field of disease. The knowledge obtained from these sources has enabled us better to understand this group of diseases. In some of them we have developed a method of clinical relief; in others, unfortunately, we have learned that these metabolic syndromes are not as simple as we at first thought them to be. Most lesions that produce metabolic disturbances are operated upon by the general surgeon. The neurosurgeon, gynecologist, or urologist, however, treat some of these lesions, such as tumors of the pituitary, ovaries, or adrenal glands.

The diagnosis and treatment of thyrotoxicosis have improved so much that the mortality and morbidity occurring in its management have been reduced to a minimum. In 1943 Astwood introduced thiouracil for the treatment of this disease. As happens with most new therapeutic agents it was received with a wave of great enthusiasm. This enthusiasm diminished considerably when we learned that the number of permanent remissions obtained in treating thyrotoxicosis was not as great as was at first anticipated. It has been tried in recurrent cases following thyroidectomy and the results are not too encouraging. In the Presbyterian Hospital in New York it was used in twenty-five recurrent cases; fifteen showed recurrence of symptoms in from one to six months after discontinuation of the drug—most of them in three months. The enthusiasm was further reduced when agranulocytosis, a complication due to the toxicity of the drug, was reported in some cases. Frequent blood counts should be included in the routine, when patients are taking this drug, to detect any early evidence of anemia or agranulocytosis. This complication is rarely fatal when recognized early, the drug discontinued, and treatment instituted; nevertheless, Beierwaltes and Sturgis recently reported an analysis of 10 fatal cases which they collected from the literature and by personal communication. Microscopical studies show that thiouracil produces hyperplasia and increased vascularity of the gland. This has been responsible for the surgeon encountering more hemorrhage in operations performed upon patients prepared by this drug preoperatively. This factor has lead many surgeons to feel that thiouracil has a distinct disadvantage over iodine and has little or no advantage in the preoperative preparation in cases of mild or moderate toxicity. Many feel, however, that thiouracil has won

its niche in the preoperative preparation of cases of severe thyrotoxicosis. In these cases many clinicians use it until the symptoms have improved appreciably, and the basal metabolic rate has been reduced to about half of its original reading. Then the drug is discontinued and iodine substituted to complete the preoperative preparation. Under this therapeutic regimen the hyperplasia and vascularity are reduced, resulting in the reduction of hemorrhage encountered in thyroidectomy. Thiouracil is of value in the preoperative preparation of patients who cannot tolerate iodine, in severe thyrocardiacs and in patients who obviously would not stand, or who refuse operation. One of the related drugs, such as propythiouracil, may prove less toxic and our deductions changed accordingly.

Apathetic thyrotoxicosis as described by Lahey in 1931 merits consideration. Since this contribution we have noted an increasing number of this type of thyrotoxicosis. Lahey not only cited the high operative mortality in this group but also pointed out that if this condition is not recognized it may be responsible for the death of a patient operated upon for some other surgical condition.

As in other diseases we now realize that liver damage plays a very significant part in fatalities from thyrotoxicosis. Two types of liver pathology have been described in this disease. Several liver function tests have been used to determine clinically the degree of liver damage. It has been advocated that liver damage plays such an important part in thyroid crises that we should call them liver crises. Chesky reported favorable results in a series of cases of advanced liver damage in which he added intravenous glucose with insulin, liver concentrate, and glycine to his routine treatment.

Surgery performed upon the diabetic is one of the most interesting of surgical fields. It was one of the first types of surgery in which we learned that the combined management of the internist and surgeon was essential both to progress and the proper care of the patient. Though our mortality and operative results have improved tremendously, there is still room for improvement in the management of emergency cases. An important accomplishment in this field in the recognition of the fact that early diabetic acidosis has a group of symptoms identical with that of many acute abdominal conditions. We no longer wait until the patient exhibits drowsiness or coma before we think of acidosis. The recognition of this hazardous complication in its earlier stage has diminished the number of patients operated upon in its presence, and thereby lowered our operative mortality.

Refrigeration in the management of cases of diabetic gangrene has proved to be of definite value. We first used this procedure only in patients who were very toxic, the result of absorption from the gangrenous process. Today refrigeration is a routine preoperative measure if the gangrene is complicated by gross infection. In operations of election we can now properly prepare the diabetic so that he is as good an operative risk as is the condition of his cardiovascular system.

The number of cases treated for hyperinsulinism is very slowly increasing. Unfortunately, no one surgeon has the opportunity of treating or operating upon many patients with this condition. The triad of symptoms characteristic of hyperinsulinism have been well recognized. They are (1) attacks of hypoglycemia, coming on during the fasting or overfatigued state, (2) associated blood sugar readings of 50 millimeters per 100 cubic centimeters or less during the attacks, and (3) relief of the shock promptly following the ingestion of glucose. Some very gratifying results have been reported when a tumor of the

islands of Langerhans has been found and removed at operation. A few cases of extrapancreatic islet tumors appear in the literature. These cases show the necessity of exploring the entire pancreas, duodenum, and other neighboring tissues before we consider our exploration for tumor complete. The real problem is the case in which no tumor is found. We have called these the functional type, and partial to subtotal pancreatectomies have been performed in an effort to obtain a cure. Follow-up studies in these cases have not been as encouraging as we at first hoped they would be.

A fairly well established routine has developed in the diagnosis and treatment of hyperparathyroidism. The infrequency with which this lesion is encountered has prohibited too great progress in this field. The incidence is substantially higher in those clinics where hyperparathyroidism is carefully sought among patients presenting themselves because of renal calculi. It is important that hyperparathyroidism be recognized even in such cases in which characteristic skeletal disease is absent because of the possibility of disastrous injury to kidney function. Just as primary hyperparathyroidism can induce serious kidney disease, serious primary kidney disease may result in a compensatory secondary hyperparathyroidism. The treatment of primary hyperparathyroidism is surgical; that of secondary hyperparathyroidism is not.

Tumors of the adrenal gland present a very complex picture. Occasionally in the course of a sympathectomy for hypertension a tumor is found in this gland which has produced no symptoms. The surgeon should be aware of the fact that a common complication following operation for a tumor of adrenal gland, whether it be cortical or medullary in origin, is adrenal insufficiency. Its treatment is the same as is used when it occurs in Addison's disease. The more important symptoms of this condition are nausea, vomiting, weakness, a rapid weak pulse, and falling blood pressure. The patient should be checked for the development of these symptoms, as there is a high mortality in those who develop adrenal insufficiency. A valuable aid in the diagnosis of adrenocortical tumors is the quantitative determination of the 17 ketosteroids in urinary assays. Callow, Talbot, and others have worked with this procedure very extensively and have established normal values in children and adults. If the determination of the 17 ketosteroids is 30 milligrams or over, it is very likely to be due to an adrenocortical carcinoma.

Would it not be well to have the lesions that occur so infrequently treated by a group of physicians particularly interested in this field of surgery? Then the intricate details of study and treatment may be carried out more thoroughly and greater progress would be made.

FREDERICK A. BOTHE.

EARLIER ILEOSTOMY IN SEVERE ULCERATIVE COLITIS

THE decision for or against recovery in patients with severe ulcerative colitis is very often settled by the time an ileostomy is done. When patients in the acute stages of ulcerative colitis are permitted to go on to the point where everyone connected with the case—surgeon, physician and the patient's relatives—agrees that the patient must have an ileostomy in order to save his or her plainly threatened life, the mortality of the procedure will be, and has been, distressingly high.

It is unfortunate that several factors operate to bring about delay in these often severely ill patients. Sometimes these patients have been through previous acute episodes of ulcerative colitis, have spontaneously recovered from

them and have had varying periods of remission from the bloody diarrhea together with the fever and toxicity which is associated with it, thus encouraging them to persist unduly with conservative measures again during subsequent acute episodes. Sometimes the mixed infections superimposed upon these acute ulcerative processes previously have been controlled by sulfasuccinate or some of the other intestinal antiseptics of the sulfa group, again encouraging delay and undue dependence upon these agents. Sometimes the physician in charge of a patient in such an acute stage of the disease has not had enough experience with it to be aware how quickly patients with relatively well controlled ulcerative colitis can, with but little apparent cause (emotional upsets or associated infections such as influenza), change to states which are real emergencies, such as bleeding from the colon which can threaten life by exsanguination, progress of the ulcerative process which can and does bring about perforation, toxic states as the result of the colon infection which threaten life by the intensity of the infection, and nutritional changes and avitaminosis as the result of the frequent loose stools which bring about serious prospects of a fatality.

Added to the above stated deterrents to an early ileostomy is the fact that until recently a patient with an ileostomy was one to be really pitied since there was no adequate way of controlling either the character or the frequency of the liquid discharges from his or her ileostomy, no bag which would really keep him from soiling his clothes or smelling, and in many of the cases the skin about the ileostomy was so irritated by the discharges from the ileum that, in spite of all protective measures, patients were constantly disturbed and distressed by an ileostomy.

All of the features of this distressing and serious disease so prejudiced patients, their relatives, surgeons, gastroenterologists, and physicians against this enterostomy that it was delayed, in a great many cases with considerable justification, until the patient's condition was so desperate that, with all of the objectionable drawbacks, ileostomy was accepted rather than the impending and obvious fatality about to occur. Evidence of the truth of these statements is the fact that in our first 80 patients upon whom ileostomy was done, our mortality rate was 26 per cent, directly the result of the lateness in the acute stage of the disease at which these patients were submitted to ileostomy.

It is because almost all of the drawbacks previously and rightly charged to ileostomy have been overcome that I wish to urge earlier ileostomies followed in many cases by later partial or complete colectomies. We have advocated and practiced early ileostomy for any patient not doing well under medical management, committing ourselves to the program of disconnecting the ileostomy and restoring the fecal stream under the following conditions: when, following the ileostomy, the patient has remained free from all symptoms for a considerable time, when haustrations as shown by barium enemas have returned to normal in the colon; when by sigmoidoscopic examination the lower bowel and rectal mucosa prove normal in appearance and when, in addition, the patient and family understand that the restoration of the fecal stream may reactivate the ulcerative colitis process and make another and permanent ileostomy necessary.

Many patients with ulcerative colitis may be satisfactorily maintained on a medical regimen (diet, psychogenic control, and typhoid vaccine) but when these measures no longer prove satisfactory, we urge and practice earlier ileostomy in these patients and have convinced our gastroenterologists and medical consultants of the wisdom and life-saving value of

this, particularly since the Koenig-Rutzen bag has become available, and since we have been able to offer these patients the possibility of closure of their ileostomy and restoration of their fecal stream in properly selected cases. The Koenig-Rutzen bag is now known to almost everyone, but for the benefit of any who do not know about it, it is a bag so made with a flanged cuff that it can be so accurately cemented to the skin about the ileostomy that there is no exposed skin left to become irritated. The character of the cement is such as to hold the bag firmly fixed to the skin so that a water tight seal, impervious to the liquid discharges from the ileum, results. The bag has a spigot at its bottom which can be folded over and closed with rubber bands and opened so that the contents of the bag when it becomes filled and heavy can be drained off into a toilet. It permits every activity its wearer desires and its availability now obviates any excuse for delay in the employment of ileostomy as a life-saving measure in patients who are in acute phases of ulcerative colitis such as have already been mentioned; hemorrhage from the colon, highly toxic states as the result of progressive infection in the colon, dangerous nutritional states, threatened perforation and frequently joint involvement (acute arthritides), weight loss and severe secondary anemias.

It is not the purpose of this editorial to discuss the many technical features which go with doing an ileostomy[1], its care, and when to follow it with colectomy, partial or complete, but to call attention forcefully to the fact that with our ability to disconnect the ileostomy and to restore the fecal stream in proper cases, and with the complete comfort and happiness a patient now can have with a Koenig-Rutzen bag, the factors which caused such an almost prohibitive mortality rate in the past in these patients have largely been overcome. In any patient with ulcerative colitis in whom any of the aforementioned complications are taking place, early ileostomy should be done and will at such a stage prove a life-saving procedure. This is well demonstrated by the fact that our earlier mortality in ileostomy of 26 per cent has, by control of these patients with earlier ileostomies for ulcerative colitis, been reduced to 2 per cent.

FRANK H. LAHEY.

[1]This has been well described and discussed by Dr. Richard B. Cattell, of this clinic, in the following article: A new type of ileostomy for chronic ulcerative colitis. Surg. Clin. N. America, 1939. 19:629-636.

THE SURGEON'S LIBRARY

REVIEWS OF NEW BOOKS

THE subjects discussed in *Physical Medicine in General Practice*[1] cover the fields of medicine surgery, and the specialties in which physical medicine has proved of value either from a therapeutic or diagnostic standpoint. Anyone reading this volume will be convinced that this field of therapy offers many advantages and has wide possibilities. The editor, Dr. Watkins, has assembled a group of contributors, all of whom are outstanding in the field. As the result of long practical experience and years of study, each of these contributors is in a position to discuss with authority the various subjects that are included under the broad heading of physical medicine.

The contributions have been written primarily for practicing physicians and surgeons. The technical side of physical medicine is minimized, and emphasis is placed upon the clinical application of the different techniques in physical medicine to the various conditions most commonly encountered by the practitioner. This book should be in the library of every general practitioner. JOHN S. COULTER.

IN the monograph entitled *The Peripheral Circulation in Health and Disease*,[2] Dr. Robert L. Richards has furnished clinicians an excellent review of vascular disorders of the extremities. The monograph is particularly interesting because it presents British and European views, and records experiences during the war with peripheral nerve injuries and the immersion foot syndrome. Chapters on occlusive vascular disease and the Raynaud phenomenon are direct and clinically useful and present the stimulating views of Sir Thomas Lewis and George W. Pickering. Practical summary of methods of study of peripheral vascular disease and of anatomical and physiologic phenomena further enhance the value of this monograph. It can be well recommended to those treating patients for disease of the extremities. K. S. GRIMSON.

NO one can read this concise and well written account[3] of one hundred cases of advanced cancer by Dr. Brunschwig without recognizing the courage and surgical skill that have made possible the results that have been achieved.

The author justly emphasizes the many developments that have made prolonged and difficult surgical procedures possible—massive blood transfusions, continuous spinal anesthesia, parenteral feeding, vitamin therapy, chemotherapy, to mention the most important—but it is obvious that none or all of them can avail unless they are utilized wisely and are combined with discriminating judgment, surgical skill and a determination not to admit defeat when the possibility of success remains.

After brief introductory chapters dealing with the historical aspect of surgery for abdominal cancer, indications and contraindications for treatment and supportive treatment, the recorded cases are divided into groups according to the anatomical structures chiefly or primarily involved—stomach, small intestines, colon, pancreas, liver, bile passages, spleen, adrenals and pelvic viscera. A chapter upon injuries to the hepatic artery, portal vein, and superior mesenteric vessels follows the chapter on carcinoma of the extrahepatic bile ducts.

The classification of cases mentioned, however, hardly gives an indication of the extent of the operative procedures carried out. In almost every instance operation involved the removal of diseased structures adjacent to the viscus primarily involved: for example, in a case of primary carcinoma of the pancreas, removal of the tail of pancreas, the spleen, five-sixths of the stomach, umbilicus and falciform ligament (Case 36, page 105); in a case of primary carcinoma of the splenic flexure removal of the left half of the transverse colon with its omentum, the spleen, lower three-fifths of the stomach and the body of the pancreas (Case 38, page 164); following an operation for gastric carcinoma removal of most of the transverse and descending colon with the omentum, 35 centimeters of jejunum and 15 centimeters of the ileum (Case 6, page 101). These and other cases with even more extensive involvement are discussed in detail and illustrated with diagrams of the operative procedures and such excellent photographs of surgical specimens that the reader can visualize clearly the serious problems encountered and the surgical procedures applied.

The results obtained by the extensive operative procedures carried out are carefully recorded in each case report and summarized in a final chapter entitled, "Results of Radical Surgical Excision in 100 Cases." In 19 of the 100 cases prolonged palliation was obtained and all 19 patients resumed their nor-

[1] PHYSICAL MEDICINE IN GENERAL PRACTICE. The American Practitioner Series. Edited by Arthur L. Watkins, M.D. Philadelphia, London, and Montreal: J. B. Lippincott Co., 1947.

[2] THE PERIPHERAL CIRCULATION IN HEALTH AND DISEASE; A STUDY IN CLINICAL SCIENCE. By Robert L. Richards, M.D. Foreword by J. R. Learmonth, C.B.E., Ch.M., F.R.C.S. Baltimore: The Williams and Wilkins Co., 1946.

[3] RADICAL SURGERY IN ADVANCED ABDOMINAL CANCER. By Alexander Brunschwig, M.D. Chicago: The University of Chicago Press, 1947.

mal activities. Six patients of this group survived for an average period of 33 months; 13 are still living after a period averaging 40 months. In a second group of 24 patients palliative results that justified operation were obtained. The average period of survival in this group was 6 months. In a third group of 6 patients, operated upon in more recent months, the average survival period on December 1, 1945, was 10 to 5 months. All resumed their former occupations. Seventeen patients survived for an average period of 3 months, and in these cases the author felt no appreciative palliative response was obtained. Thirty-four patients died within 30 days of operation and were considered as operative fatalities.

The results that Dr. Brunschwig has obtained are truly remarkable in view of the serious conditions and the extent of the disease encountered in practically every case. He has not minimized the difficulty involved either in diagnosis, in treatment, or in prognosis. In two of his cases (Case 60, page 98; Case 6, page 101) recurrence took place 5½ years and 1 year, 8 months after operation for gastric carcinoma. In each case a secondary radical procedure was carried out—without success in the first case, a man of 73 years, and with 2 years of palliation and useful life in the second case, a man of 37 years. Such cases illustrate again the difficulties in prognosis that confront the surgeon in dealing with widespread cancerous growths and the fact that he will at times achieve both unexpected success when the outlook appears almost hopeless, and that in other cases when the prognosis seems encouraging, results may be disappointing.

This volume will prove both a stimulus and a challenge to every surgeon interested and working in the field of abdominal cancer. The author has made a record that will prove difficult to surpass, but that will encourage every thoughtful surgeon to strive to emulate his courage, his resourcefulness, and his careful management of the difficult surgical patient.

SUMNER L. KOCH.

IT is difficult to review as established a text as the DeLee *Obstetrics*. To say that the new edition is "better" or "worse" than previous editions implies a common opinion between reader and reviewer as to the place of such previous versions. Some day, without doubt, the time will come when a volume such as this, appearing periodically in new issues, will have to be re-evaluated and reconsidered as a totally new text. All reference to previous editions and to the history of the book will have to be dispensed with in favor of a completely new estimation of the work as an aid to student and to practitioner.

In the instance of the present *Principles and Practice of Obstetrics*[1], however, comparison with what has gone before is inevitable. No two previous consecutive editions of this textbook have differed from each other as much as do the 8th and 9th. Dr. Greenhill, the editor of the last two editions, has made an extensive revision in preparing the most recent text.

New material has been added, including chapters on the minor disturbances of pregnancy, premature labor, prolonged pregnancy or post-maturity and missed labor, fetal erythroblastosis, care of premature babies and circumcision. These chapters in some instances represent a regrouping of previous material; in many instances they are new additions. In their emphasis they conform with the remainder of the book, being principally concerned with the purely clinical aspects of each problem rather than with the fundamental physiology or or physiologic pathology involved. The section on analgesia and anesthesia has also been expanded to include the technique of caudal anesthesia as well as excellent descriptions of local and infiltration anesthesias.

Changes have also been made in the form and typographical presentation of the book. Of these, the most striking is the division of the text on each page into two columns, aimed at increasing the ease of reading. Gone (fortunately) are many of the sections in fine print, so that a far greater percentage of the book is in the standard face type. In addition to expanding the bibliography at each chapter-end, Dr. Greenhill has included the titles of the references, thereby tremendously increasing the value of this portion of the work.

It is inevitable that with changing editions some of Dr. DeLee's original touch will be lost. The introductory chapter which has graced so many editions has now become merely the opening paragraph of chapter one. Some such deletions are obviously necessary, however, to permit the inclusion of new subject matter and additional illustrations. In some instances, further editing will help. For example the dictum concerning babies of luetic mothers still remains that "the child is almost invariably diseased even if it shows no evidence of syphilis." In the present edition this sentence is only two paragraphs removed from the statement that the penicillin therapy of syphilis provides a 95 per cent protection rate to the infant.

Such items are not frequent, however, and form a small fraction of the total mass of material covered by the text. The book will remain one of the prime sources of obstetric information for both student and practitioner, and the editor has done an admirable job on the present revision.

ALLAN C. BARNES.

IN his recent book[2] concerning hormonal relations of the fetus Dr. Samuels develops the thesis that all endocrine relations in pregnancy represent a balance between maternal and fetal gonadotropins. Those who have followed the meticulous separation and identification of pituitary gonadotropins in this country will not be convinced by the awkward mental somersaults used to justify many of the author's categoric conclusions. The evidence presented for the identity of the thyrotropic and luteinizing hormones, for instance, is inadequate to this reviewer.

[1] PRINCIPLES AND PRACTICE OF OBSTETRICS. By J. B. DeLee, M.D., and J. P. Greenhill, M.D. 9th ed. Philadelphia and London: W. B. Saunders Co., 1947.

[2] DIE HORMONVERSORGUNG DE FOETUS. By Jules Samuels. Leiden, Netherlands: E. J. Brill, 1947.

The certainty with which such hypotheses are stated as facts suggests a somewhat uncritical scientific approach to the complex problems of hormone interrelationships.

An immense bibliography of 544 items contains only a rare reference to work as late as 1940. It is regrettable that the 20 page English summary could not have been written by one more familiar with the language. On the whole, this book has little to offer to the student of endocrinology.

SOMERS H. STURGIS.

AN excellent summary of present day gynecologic endocrinology is contained in Dr. Claude Béclère's new book, *Diagnostic hormonal et traitements hormonaux en gynecologie.*[1] The book represents, however, the experience and methods of the author rather than presenting a consensus of opinions. "This book is not a bibliographic compilation" says the preface, a statement borne out by only 102 references of which almost two-thirds refer to the author's own papers. The handling of topics is quite dogmatic and inflexible, and gives the impression that most endocrine conditions can be easily diagnosed and that treatment is invariably satisfactory and certain.

There are numerous points of difference between contemporary American literature and Dr. Béclère's book to wit:

Although considerable doubt has been cast on the use of progesterone in habitual abortion in recent years, Dr. Béclère feels that "treatment by corpus luteum hormone gives remarkable results in cases of habitual abortion." In discussing testosterone Hamblen "condemns its use for any reason whatsoever in the female, "while Dr. Béclère states that testosterone constitutes the present treatment of choice of functional uterine hemorrhages and advises its use in the treatment of hemorrhages due to uterine fibromyomas, premenstrual mammary pain, precocious breast development and in the treatment of a variety of premenstrual and postmenstrual symptoms. He feels that "each time that one wishes to have a direct checking action upon the hypophysis with the minimum of extrinsic action one should use the male hormone."

The subject of sterility is covered in four pages. The physiology of the transport of sperm and egg is briefly discussed. Dr. Béclère states that "chronic genital infections and especially gonococcal infections are the principal cause of primary or secondary sterility in women and "female sterility is far more frequent than male sterility." He attributes a certain number of cases of female sterility to "spasm of the uterine isthmus." There is no discussion of testicular biopsy or of the value of thyroid extract in the treatment of infertility.

In spite of the criticisms that have been made the book is well planned, well arranged, and very clear and definite in its phraseology. It will prove of great value to the general practitioner in France and contains much to interest and challenge the American gynecologist who is interested in endocrinology.

CRAIG W MUCKLE.

[1] DIAGNOSTIC HORMONAL ET TRAITEMENTS HORMONAUX GYNECOLOGIE. By Claude Béclère. Paris: Masson et Cie, 1946.

BOOKS RECEIVED

Books received are acknowledged in this department, and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the intrests of our readers and as space permits.

RH . . . ITS RELATION TO CONGENITAL HEMOLYTIC DISEASE AND TO INTRAGROUP TRANSFUSION REACTIONS. By Edith L. Potter, M.D., Ph.D. Chicago: The Year Book Publishers, Inc., 1947.

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CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

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ARTHUR W. ALLEN, Boston, *President-Elect*

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PRELIMINARY PROGRAM FOR 1947 CLINICAL CONGRESS, THE WALDORF-ASTORIA, NEW YORK, SEPTEMBER 8 TO 12, 1947

THE thirty-third annual Clinical Congress of the American College of Surgeons will be held in New York from September 8 to 12, with headquarters at The Waldorf-Astoria. The five-day program at the headquarters hotel includes scientific sessions in surgery and the surgical specialties, hospital conferences, showings of medical motion pictures, official meetings, and educational and technical exhibits.

Every morning and afternoon, operative and nonoperative clinics will be held in the hospitals of New York and Brooklyn. The latest developments in surgery and related fields will be presented. Preliminary outlines of both the clinical program and the sessions at the headquarters hotel are shown on succeeding pages.

The program of the Congress will include the twenty-sixth annual Hospital Standardization Conference, which will convene during the first four days, with morning and afternoon sessions on Monday through Thursday beginning at 9:30 and 2:00 o'clock respectively, and evening meetings on Tuesday, Wednesday and Thursday beginning at 8:00.

The first event on the Clinical Congress program will be the General Assembly for surgeons and hospital representatives which will be held on Monday morning at 10:00 o'clock. The Monday afternoon program will include two panel discussions, one beginning at 1:30, the other at 3:00; clinics in the hospitals; a hospital conference; and a surgical film exhibition. The Monday evening program will consist of the Presidential Meeting.

The Tuesday morning program will include clinics in the hospitals; the Forum on Fundamental Surgical Problems; a panel discussion on ophthalmology from 9:00 to 10:30; a panel discussion on otorhinolaryngology from 10:45 to 12:15; a hospital conference; and surgical film exhibitions. On Tuesday afternoon there will be clinics in the hospitals; panel discussions from 1:30 to 3:00 and from 3:30 to 5:00; a symposium on fractures and other traumas; a panel discussion of "Organization for Diagnosis and Treatment of Cancer—Clinics and Detection Centers"; a hospital conference; and surgical film exhibitions. On Tuesday evening there will be three scientific sessions—one on general surgery, one on ophthalmology, and the third on otorhinolaryngology.

The Wednesday and Thursday programs will follow the same pattern except that on Wednesday afternoon a symposium on cancer will replace those on fractures, and on organization of cancer clinics and detection centers, and that on Thursday afternoon these will be replaced by the annual meeting of Fellows at 1:45 and a panel on graduate training in surgery at 3:30 o'clock. On Wednesday evening the ophthalmologists and otorhinolaryngologists will meet in joint session.

The Friday morning program will consist of clinics in the hospitals, the Forum on Fundamental Surgical Problems, and surgical film exhibitions. The Friday afternoon program will include the Assembly of Initiates; clinics in the hospitals; six concurrent panel discussions on, respectively, obstetrics, plastic surgery, neurological surgery, thoracic surgery, urology, and orthopedic surgery; and a surgical film exhibition. The concluding event of the Clinical Congress program will be the Convocation on Friday evening at 8:15 o'clock in the Grand Ballroom.

CLINICAL PROGRAM

The hospitals and medical schools of greater New York are co-operating in scheduling operative and nonoperative clinics, and group clinical conferences. Visiting surgeons will have excellent opportunities to attend well arranged programs of many different kinds in selected hospitals in the area. General and special demonstrations will be held on such subjects as fractures, cancer, maternal morbidity, and end-result studies; clinicopathologic and x-ray conferences; newer diagnostic and therapeutic procedures; preoperative and postoperative supportive treatment; anesthesia; reconditioning; and many other timely subjects. Good opportunities for studying the newer techniques and surgical procedures will be provided.

The program of each general hospital will be arranged to cover subjects in general surgery, obstetrics and gynecology, fractures, orthopedic surgery, thoracic surgery, neurosurgery, genitourinary surgery, ophthalmology, and otolaryngology.

The list of hospitals which are participating in the clinical program, with the names of the hospital representatives, follows:

New York

Beekman Downtown Hospital
Bellevue Hospital
  First Division—Robert Wylie
  Second Division—Ernest Lampe
  Third Division—W. B. Murphy
  Fourth Division—Vansel Johnson
Beth Israel Hospital—Samuel Standard
Flower and Fifth Avenue Hospitals—S. T. Glasser
Goldwater Memorial Hospital—Condict Cutler
Harlem Hospital—David Smith
Harlem Eye and Ear Hospital—C. B. Meding
Hospital for Joint Diseases—A. J. Beller
Hospital for Special Surgery—T. C. Thompson
Lenox Hill Hospital—Otto Pickhardt
Manhattan Eye, Ear and Throat Hospital—Frank Keil and Joseph D. Kelly
Memorial Hospital for the Treatment of Cancer and Allied Diseases—Allen O. Whipple
Metropolitan Hospital—Kenneth C. Peacock
Montefiore Hospital for Chronic Diseases and Country Sanitorium—Arthur H. Aufses
Mt. Sinai Hospital—Ralph Colp
New York Hospital—S. W. Moore
  Lying-in Hospital—Gordon Douglas
New York Eye and Ear Infirmary—Stuart L. Craig
New York Orthopedic Dispensary and Hospital—Halford Hallock
New York Post-Graduate Medical School and Hospital—R. F. Carter
Presbyterian Hospital
  Babies Hospital—Thomas V. Santulli
  Neurological Institute—John Scarff
  Presbyterian Hospital—John S. Scudder
  Sloane Hospital for Women—Charles Lee Buxton
Roosevelt Hospital—James E. Thompson
St. Luke's Hospital—Paul C. Morton
St. Vincent's Hospital—Raymond P. Sullivan
U.S. Marine Hospital.
Veterans Administration Hospital—Paul K. Sauer
Woman's Hospital—Ralph L. Barrett

Brooklyn

Brooklyn Eye and Ear Hospital—M. A. Lasky
Cumberland Hospital—Herbert Wikle
House of St. Giles, The Cripple—C. C. Vitale
Jewish Hospital—Louis Berger
Kings County Hospital—Joseph Tenopyr
  Long Island College Division—Philip Lear
Long Island College Hospital—Albert Ritzmann
Methodist Hospital—P. A. Renaud
St. John's Hospital—Merrill N. Foote

GENERAL ASSEMBLY

The Clinical Congress will open with a general assembly in the Grand Ballroom of The Waldorf-Astoria at 9:30 o'clock on Monday morning. Dr. Irvin Abell, President of the College, will preside at this meeting which will be the first session of the twenty-sixth annual Hospital Standardization Conference. Dr. Abell will give a summary of the past year's activities of the American College of Surgeons as related to hospitals. The need for good medical staff organization and control of the professional work of the hospital will be discussed by Dr. Evarts A. Graham of St. Louis, a past president of the College; better distribution of hospital service will be the subject of a talk by Graham L. Davis of Battle Creek, President-Elect of the American Hospital Association; planning a career in surgery will be discussed by Dr. H. Prather Saunders, Assistant Director of the College; and an address on "The New Era in Personnel Relations and its Meaning for Hospitals" will be presented by Brigadier General Robert W. Johnson, Chairman of the Board of Johnson & Johnson, New Brunswick, New Jersey.

The program will conclude with a discussion of "The Potentialities of the Medical Motion Picture for Teaching Purposes," by Dr. Warren H. Cole of Chicago, in collaboration with Thomas Jones, Professor of Medical Illustration, University of Illinois College of Medicine. The talks will be followed by a première showing of the new picture directed by Dr. Cole and produced by the College

with the aid of a grant from the Johnson & Johnson Research Foundation, entitled "Anomalies of the Bile Ducts and Blood Vessels; Strictures of the Common Duct."

PRESIDENTIAL MEETING

The Presidential Meeting will be held on Monday evening in the Grand Ballroom of The Waldorf-Astoria. The officers, regents and distinguished guests will participate in the processional. Dr. Irvin Abell, President of the College, will preside. The address of welcome will be given by Dr. Howard A. Patterson of New York, Chairman of the Committee on Arrangements. Foreign and other guests will be introduced by Dr. Arthur W. Allen of Boston, Vice Chairman of the Board of Regents. Dr. Abell will deliver the Presidential Address on the subject, "The Spirit of Surgery."

An inaugural ceremony will be held for the incoming officers: President, Dr. Arthur W. Allen of Boston; First Vice-President, Dr. Thomas E. Jones of Cleveland; Second Vice-President, Dr. Gordon B. New of Rochester, Minnesota.

The second Martin Memorial Lecture will be a feature of the Presidential Meeting. Dr. Allen O. Whipple of New York has accepted the invitation to give this lecture and his subject will be, "The Qualifications of the Surgeon and the Cancer Problem." The lectureship was established upon motion of the Board of Regents at a meeting on April 1, 1946, as a memorial to Dr. Franklin H. Martin and Mrs. Martin. The founder of the College and of SURGERY, GYNECOLOGY AND OBSTETRICS was joined by his wife in making the College the beneficiary at their deaths of the Journal, together with its physical plant then operated by The Surgical Publishing Company of Chicago, of which they were the owners. Dr. Martin died in 1935 and Mrs. Martin in 1945.

CONVOCATION

The Convocation will be held on Friday evening in the Grand Ballroom. It will open with a processional of officers, regents, governors, and initiates. The President, Dr. Arthur W. Allen, will preside, confer the honorary fellowships, and present the candidates for fellowship.

An Assembly of Initiates will be held at 1:30 o'clock on Friday afternoon in order to instruct them in the Convocation procedure and other matters.

The Fellowship Address will be delivered by Dr. Andrew C. Ivy of Chicago, Vice President, University of Illinois, in charge of Chicago Professional Colleges and Distinguished Professor of Physiology.

FORUM ON FUNDAMENTAL SURGICAL PROBLEMS

The Forum on Fundamental Surgical Problems will be conducted on Tuesday, Wednesday, Thursday, and Friday mornings, from 9:00 a.m. to 12:30 p.m. The Forum affords a large surgical audience the opportunity to become acquainted with the work of many productive clinical and experimental investigators through the medium of the concise presentation; at the same time, it gives a number of young, well trained surgeons their first opportunity of a hearing before a national surgical organization. It is the professed purpose of the Surgical Forum, as expressed by Dr. Owen H. Wangensteen, Chairman of the Forum Committee, to "attempt to bring before its assembly each year the best that is new in surgery; announcement of new-found knowledge of special interest to surgeons and wider dissemination of new, significant information in the interphases between surgery and allied medical specialties suggests the objectives which the sponsors have in mind in the formulation of programs for presentation."

Selection of papers for the New York Clinical Congress has been made by the committee, which is guided by originality of thought and interest suggested in the abstract submitted by the author.

GENERAL SURGERY

In general surgery, the program at the headquarters hotel will embrace three evening symposia and seven afternoon panel discussions.

The Tuesday evening symposium will be on "The Proper Use of Blood and Blood Plasma." The Wednesday evening symposium will be on "Nutritional Requirements in Surgery," with an additional feature, the annual Fracture Oration, which will be delivered by Dr. Frank D. Dickson of St. Louis. The Thursday evening symposium will be on "Hypertension."

The following subjects have been chosen for the afternoon panel discussions in general surgery, the first one of which will be held from 1:30 to 3:00 and the second from 3:30 to 5:00 o'clock on the days specified: "Pulmonary Suppuration" and "Pancreatitis" on Monday; "Surgery of the Spleen" and "Jaundice" on Tuesday; "Gastric Surgery" and "Use of Antibiotic Agents and Chemotherapy in Surgery" on Wednesday. On Thursday afternoon there will be only one panel discussion, from 3:30 to 5:00, on "Surgery of the Hand."

Detailed programs are published on succeeding pages.

SURGICAL SPECIALTIES

Panel discussions on the surgical specialties will be held on Friday afternoon, from 1:30 to 5:00 o'clock. The panels will be held concurrently in

the following fields: orthopedic surgery, neurosurgery, plastic surgery, obstetrics and gynecology, urology and thoracic surgery. Partial programs are shown on succeeding pages.

OPHTHALMOLOGY

An exceptionally interesting program is being planned for ophthalmologists, consisting of two evening sessions, three morning panel discussions from 9:00 to 10:30, and an evening session on Wednesday in which a combined program with the otorhinolaryngologists will be held.

Subjects for the Tuesday evening session will be "Epithelial Down-growth Following Cataract Operation," "Local Anesthesia in Ophthalmology," "Operative Treatment of Vertical Tropias," and "Prevention and Management of Operative Complications during Cataract Extraction." At the Wednesday evening combined session the subjects will be "Blood Supply of Eye and Sinuses," "Dacryocystorhinostomy," "Sinus Surgery in Eye Diseases," and "Ophthalmoneurological Symptoms in Nasopharyngeal Tumors." Subjects for the Thursday evening session will be "Prevention of Infection in Eye Surgery," "Glaucoma Following Cataract Extraction," "Retinal Detachment," and "The Difficult Cataract Extraction."

The morning panel discussions will be on the following subjects: "Surgery of Extraoscular Muscles" on Tuesday; "Surgery of Glaucoma" on Wednesday; and "Angiospastic Ocular Lesions" on Thursday.

OTORHINOLARYNGOLOGY

The program in otorhinolaryngology will consist of two evening symposia, an evening session on Wednesday in which a combined program with the ophthalmologists will be held, and three morning panel discussions from 10:45 to 12:15. The fact that the morning panel discussions are planned this year to follow those on ophthalmology instead of being held simultaneously as they were in Cleveland, will enable surgeons who combine these specialties in their practice to attend both sessions.

The subjects for the evening symposia will be "Bronchiectasis" on Tuesday, and "Management of Carcinoma of the Larynx" on Thursday. The subjects for the Wednesday evening joint session are listed under "Ophthalmology" and also on succeeding pages which carry the detailed programs.

The morning panel discussions will be on the following subjects: "The Use of Antibiotics in Ear, Nose and Throat Surgery" on Tuesday; "Rehabilitation of the Larynx in Bilateral Adductor Paralysis of the Vocal Cords" on Wednesday; and "Anesthesia for Ear, Nose and Throat Surgery" on Thursday.

SYMPOSIUM ON FRACTURES AND OTHER TRAUMAS

"Appraisal of Present Methods of Treatment" is the general theme of the symposium on fractures and other traumas which has been arranged by Dr. Robert H. Kennedy of New York, Chairman of the Committee on Fractures and Other Traumas of the American College of Surgeons. From the program shown on a succeeding page it will be seen that five talks on the following subjects are included: "Intracapsular Fractures of the Neck of the Femur," "Fractures of the Upper Extremity of the Tibia Involving the Knee Joint," "Injuries of the Intervertebral Disc," "Fractures of the Os Calcis," and "Bone Plates and Screws."

SYMPOSIA ON CANCER

Two symposia on cancer are scheduled this year, one on Tuesday afternoon from 2:00 to 5:00 at which organization for the diagnosis and treatment of cancer, including cancer clinics and cancer detection centers, will be discussed, and the other on Wednesday afternoon from 2:00 to 5:00 at which the latest scientific developments in the attack on cancer will be presented.

GRADUATE TRAINING IN SURGERY

Dr. Dallas B. Phemister of Chicago, Chairman of the Committee on Graduate Training of the American College of Surgeons, will be the moderator of the symposium on Graduate Training in Surgery on Thursday afternoon from 3:30 to 5:30. The speakers will be Dr. Albert C. Furstenberg, Dr. Richard B. Cattell and Dr. Charles B. Puestow. Dr. Frederick A. Coller will lead the concluding discussion of problems in graduate training in surgery.

HOSPITAL STANDARDIZATION CONFERENCE

The first formal session of the Clinical Congress will be the opening meeting of the twenty-sixth Hospital Standardization Conference. Dr. Irvin Abell of Louisville, President of the American College of Surgeons, will preside. The hospital conferences will continue on Monday afternoon, with sessions following on Tuesday, Wednesday and Thursday mornings, afternoons and evenings as well.

Hospital administrators, members of governing boards, medical staff members, heads of the vari-

ous hospital departments and their personnel, nurses, dietitians, medical records librarians, and many other persons directly concerned about hospital progress, will be interested in the discussions of current hospital problems.

The Monday afternoon session will be devoted to a panel discussion on current problems in medical service in hospitals; Tuesday morning to improvement in food service in hospitals; Tuesday afternoon to improvement in nursing service in hospitals; Tuesday evening to a joint session for hospital trustees, medical staff officers, and administrators; Wednesday morning to discussion of personnel and public relations; Wednesday afternoon to a joint session with the American Association of Medical Record Librarians on improving medical records; Wednesday evening to a forum on trends in hospital administration and special hospital problems; Thursday morning to a forum on special problems; Thursday afternoon to a round table conference on problems of the small hospital in meeting the standards of the American College of Surgeons and to a symposium on Graduate Training in Surgery; and Thursday evening to a special conference on the point rating system.

Detailed programs appear on succeeding pages.

ANNUAL MEETING

The annual meeting of the Governors and Fellows will be held on Thursday afternoon at 1:45. There will be election of officers and governors. The annual meeting affords the Fellows of the College an opportunity to hear reports of officials on the work of the organization, and to broaden their knowledge of the methods, and their effectiveness, which are used to raise the professional and ethical standards of surgery, and to promote good hospital care and general improvement in the practice of medicine. Each Fellow has a personal part in this work and may extend the influence of the College materially in his local community and wherever his contacts extend. Hospital Standardization particularly offers him wide opportunity to provide better medical care for his patients in the hospital in which he works, through continuous progress in applying the principles of the Minimum Standard which insure the best care of the patient.

Every Fellow will be interested in the reports which will be presented on the following subjects: finances; Hospital Standardization; Graduate Training in Surgery; Medical Motion Pictures; Publications; Public Relations; Library and Literary Research; the work of the state and provincial credentials committees, committees on applicants, and the Committee on History Reviews; Sectional Meetings, 1947; and the Department of Clinical Research, including cancer clinics and cancer detection centers, the Committee on Cancer, Medical Service in Industry, and the Committee on Fractures and other Traumas. Dr. Abell, Chairman of the Board of Regents, will report on administration of the College and Dr. Arthur W. Allen will discuss the obligations and opportunities of the Fellows.

MEDICAL MOTION PICTURES

The latest available films demonstrating surgical procedures and related subjects will be shown in the medical motion picture exhibits which will be held daily in The Waldorf-Astoria. Motion pictures are a much appreciated feature of the Clinical Congress. Many new pictures on varied subjects are being received by the American College of Surgeons for review. Both sound and silent colored films will be shown during the Congress, all of which will have been approved by the Committee on Medical Motion Pictures.

There will also be shown the first of a series of films which are being produced by the College under a grant from the Johnson & Johnson Research Foundation. The film is entitled, "Anomalies of the Bile Ducts and Blood Vessels; Strictures of the Common Duct," a teaching film of which Dr. Warren H. Cole of Chicago is the author. It is contemplated that there will also be completed in advance of the Clinical Congress at least one additional film which is being produced by the College under the expanded program.

ADVANCE REGISTRATION

The hospitals and medical schools of New York afford accommodations for a large number of visiting surgeons. However, in order to insure against overcrowding, attendance at the Congress will be limited to the number that can be accommodated at the clinics and meetings. It is therefore expected that surgeons who wish to attend the Congress will register in advance.

Because of greatly increased costs and expenses to which the College will be subjected this year in connection with its New York Clinical Congress, the Board of Regents has found it necessary to require a registration fee of $5.00 for Fellows and for endorsed Junior Candidates. Non-Fellows attending as invited guests of the College will pay a fee of $10.00. No fee will be required of initiates of the class of 1947.

To each surgeon who registers in advance a formal receipt will be issued. This is to be exchanged for a general admission card upon his registration at headquarters during the Congress.

This card is not transferable and must be presented in order to obtain clinic tickets and admission to scientific sessions.

The registration desk will be open from 3:00 to 9:00 p.m. on Sunday, September 7, in order to permit surgeons to obtain tickets for the Monday clinics. A new plan is to be adopted in New York of distributing clinic tickets on the day prior to the clinics, from 9:00 a.m. to 5 p.m. Any remaining tickets will be available at 7:00 a.m. the same day on which the clinics are held.

TECHNICAL AND SCIENTIFIC EXHIBITION

The technical exhibit, together with the registration and clinic ticket bureaus, will be located in the Basildon Room, Jade Room, and Astor Gallery, all on the third floor of the hotel. Leading manufacturers of surgical instruments, x-ray apparatus, sterilizers, operating room lights, ligatures, dressings, hospital apparatus and supplies of all kinds, and pharmaceuticals, and publishers of medical books will be represented in the exhibition. The technical exhibits will demonstrate many of the new features learned from our experience in the war.

HOTEL RESERVATIONS

Although the prospect is that the hotel situation in New York will be more favorable than it would have been last year, nevertheless there is still a critical shortage of hotel rooms and early reservations are most desirable. In making these, communications should be addressed to the New York Convention Bureau, through which all reservations for the Clinical Congress are to clear. No correspondence should be sent directly to the hotels. A letter has been sent to Fellows in which the procedure is outlined. With this letter was enclosed a form to be used in making reservations. Choices of hotels may be designated. The following hotels are recommended by the Committee:

	Minimum Rates with Bath	
	Single	Double
Allerton House, 143 East 39th Street	$2.75	$
Allerton House for Women, 130 East 57th Street	3.00	
Ambassador, Park Avenue and 51st Street	6.00	
Astor, Broadway and 44th Street	$3.50	$4.00
Barbizon (Women), Lexington Avenue and 63rd Street	3.50	
Barclay, 111 East 48th Street	6.00	8.00
Belmont Plaza, Lexington Avenue and 49th Street	4.00	6.00
Beverly, Lexington Avenue and 50th Street	5.00	
Biltmore, Madison Avenue and 43rd Street	5.50	7.50
Bristol, 129 West 48th Street	2.50	3.50
Capitol, 51st Street and 8th Avenue	3.00	4.50
Carlyle, Madison Avenue at 76th Street	6.00	
Chesterfield, 130 West 49th Street	2.50	4.00
Commodore, Lexington Avenue and 42nd Street	3.50	5.50
Concourse Plaza, Grand Concourse and 161st Street	3.50	5.50
Cornish Arms, 311 West 23rd Street	2.25	4.00
Delmonico, 502 Park Avenue	6.00	8.00
Essex House, 160 Central Park South	6.00	8.00
Fifth Avenue Hotel, 24 Fifth Avenue (9th Street)	4.00	6.00
Governor Clinton, 31st Street and 7th Avenue	3.30	4.40
Henry Hudson, 353 West 57th Street	2.50	3.50
Kenmore Hall, 145 East 23rd Street	2.00	3.50
Lexington, 48th Street and Lexington Avenue	4.00	6.00
Luxor Baths Hotel, 121 West 46th Street	2.25	
McAlpin, Broadway and 34th Street	3.30	4.95
Martinique, Broadway at 32nd Street	2.75	3.85
Midston House, 22 East 38th Street	3.50	4.00
New Weston, Madison Avenue and 50th Street	4.00	7.00
New Yorker, 34th Street and 8th Avenue	3.85	5.50
Paramount, 46th Street, West of Broadway	3.00	5.00
Park Central, 7th Avenue and 55th Street	4.00	6.00
Parkside, 18 Gramercy Park South	2.75	
Pennsylvania, 7th Avenue and 33rd Street	3.85	5.50
Piccadilly, 227 West 45th Street	3.00	5.00
Plymouth, 143 West 49th Street	2.50	3.50
President, 234 West 48th Street	2.50	4.00
Prince George, 14 East 28th Street	2.50	4.00
Roosevelt, Madison Avenue and 45th Street	4.50	6.50
Shelton, 49th Street and Lexington Avenue	3.50	5.00
Taft, 7th Avenue and 50th Street	3.00	5.00
Times Square, 43rd Street and 8th Avenue	2.25	4.00
Tudor, 304 East 42nd Street	2.50	
Victoria, 7th Avenue and 51st Street	3.00	4.50
Waldorf-Astoria, 50th Street and Park Avenue	7.00	
Warwick, 54th Street at Sixth Avenue	5.00	
Wellington, 7th Avenue and 55th Street	3.00	4.50
Woodstock, 127 West 43rd Street	3.00	5.00

CLINICAL CONGRESS PROGRAM IN BRIEF

Monday

10:00–12:15 General Assembly for Surgeons and Hospital Representatives.
1:30– 3:30 Panel Discussion.
2:00– 5:00 Clinics, Demonstrations and Clinical Group Conferences, selected local hospitals.
2:00– 5:00 Hospital Conference.
2:00– 5:00 Surgical Film Exhibition (General).
3:30– 5:00 Panel Discussion.
8:15–10:30 Presidential Meeting.

Tuesday

8:00–12:00 Clinics, Demonstrations and Clinical Group Conferences, selected local hospitals.
9:00–12:30 Forum on Fundamental Surgical Problems.
9:00–10:30 Panel Discussion—Ophthalmology.
9:30–12:15 Hospital Conference.
9:30–12:30 Surgical Film Exhibition (General).
10:45–12:15 Panel Discussion—Otorhinolaryngology.
1:30– 3:00 Panel Discussion.
2:00– 5:00 Clinics, Demonstrations—selected local hospitals.
2:00– 5:00 Hospital Conference.
2:00– 5:00 Panel Discussion on Cancer Clinics and Detection Centers.
2:00– 5:00 Symposium on Fractures and Other Traumas.
2:00– 5:00 Surgical Film Exhibition (General).
2:00– 4:00 Surgical Film Exhibition (Eye, Ear, Nose and Throat).
3:30– 5:00 Panel Discussion.
7:00– 8:00 Surgical Film Exhibition (Eye, Ear, Nose and Throat).
8:00–10:30 Hospital Conference.
8:00–10:30 Scientific Session, General Surgery.
8:00–10:30 Scientific Session, Ophthalmology.
8:00–10:30 Scientific Session, Otorhinolaryngology.

Wednesday

8:00– 9:00 Meeting of Cancer Committee.
8:00–12:00 Clinics, Demonstrations and Clinical Group Conferences, selected local hospitals.
9:00–12:30 Forum on Fundamental Surgical Problems.
9:00–10:30 Panel Discussion—Ophthalmology.
9:30–12:15 Hospital Conference.
9:30–12:30 Surgical Film Exhibition (General).
9:30–10:15 Executive Committees.
10:15–11:00 Credentials Committees and Committees on Applicants.
10:45–12:15 Panel Discussion—Otorhinolaryngology.
12:00– 2:00 Meeting of Board of Governors.
1:30– 3:00 Panel Discussion.
2:00– 5:00 Clinics, Demonstrations and Clinical Group Conferences, selected local hospitals.
2:00– 5:00 Symposium on Cancer.
2:00– 5:00 Surgical Film Exhibition (General).
2:00– 4:00 Surgical Film Exhibition (Eye, Ear, Nose and Throat).
2:00– 5:00 Hospital Conference.
3:30– 5:00 Panel Discussion.
7:00– 8:00 Surgical Film Exhibition (Eye, Ear, Nose and Throat).
8:00–10:30 Hospital Conference.
8:00–10:00 Scientific Session, General Surgery.
8:00–10:00 Scientific Session (Eye, Ear, Nose and Throat).

Thursday

8:00–12:00 Clinics, Demonstrations and Clinical Group Conferences, selected local hospitals.
9:00–12:30 Forum on Fundamental Surgical Problems.
9:00–10:30 Panel Discussion—Ophthalmology.
9:30–12:15 Hospital Conference.
9:30–12:30 Surgical Film Exhibition (General).
10:45–12:15 Panel Discussion—Otorhinolaryngology.
1:30– 1:45 Adjourned Meeting, Governors.
1:45– 3:00 Annual Meeting, Fellows.
2:00– 5:00 Clinics, Demonstrations and Clinical Group Conferences, selected local hospitals.
2:00– 5:00 Hospital Conference.
3:30– 5:30 Panel Discussion—Graduate Training in Surgery.
3:30– 5:00 Panel Discussion.
3:30– 5:30 Surgical Film Exhibition (General).
3:30– 5:30 Surgical Film Exhibition (Eye, Ear, Nose and Throat).
3:30– 5:00 National and Regional Fracture Committees.
4:00– 5:00 Committee on the Library.
7:00– 8:00 Surgical Film Exhibition (Eye, Ear, Nose and Throat).
8:00–10:30 Scientific Session, General Surgery.
8:00–10:30 Scientific Session, Ophthalmology.
8:00–10:30 Scientific Session, Otorhinolaryngology.

Friday

8:00–12:00 Clinics, Demonstrations and Clinical Group Conferences, selected local hospitals.
9:00–12:30 Forum on Fundamental Surgical Problems.
9:30–10:30 Surgical Film Exhibition (Eye, Ear, Nose and Throat).
9:30–12:00 Special Hospital Conference—Point Rating System.
10:30–12:00 Surgical Film Exhibition (General).
1:30– 5:00 Panel Discussions on each of the following fields, concurrently:
Obstetrics.
Plastic Surgery.
Neurological Surgery.
Thoracic Surgery.
Urology.
Orthopedic Surgery.
1:45– 2:15 Assembly of Initiates.
2:00– 5:00 Clinics, Demonstrations and Clinical Group Conferences, selected local hospitals.
2:00– 5:00 Surgical Film Exhibition (General).
8:15–10:00 Convocation.

GENERAL ASSEMBLY

JOINT SESSION—SURGEONS AND HOSPITAL REPRESENTATIVES

Monday, 10:00 a.m.–12:30 p.m.—Grand Ballroom—The Waldorf-Astoria

IRVIN ABELL, M.D., Louisville; President, American College of Surgeons, Presiding.
Welcome from the Mayor and the Hospitals of New York. E. M. BERNECKER, M.D., New York; Commissioner, Department of Hospitals, City of New York.
Greetings from the American Hospital Association. JOHN H. HAYES, New York; President.
Greetings from the Canadian Hospital Council. HARVEY AGNEW, M.D., Toronto; Secretary.
Summary of College Activities as Related to Hospitals for Past Year. IRVIN ABELL, M.D., Chairman, Board of Regents.
Need for Efficient Medical Staff Organization and Control of the Professional Work of the Hospital. HAROLD L. FOSS, Danville, Pennsylvania; Surgeon-in-Chief, Geisinger Memorial Hospital.
Better Hospital Facilities for Rural Patients—Plans to Integrate Small General Hospitals with Nearest Institutions Incorporating Specialized Services. GRAHAM L. DAVIS, Battle Creek; Hospital Director, W. K. Kellogg Foundation; President-Elect, American Hospital Association.
Planning for a Career in Surgery. H. FRATHER SAUNDERS, M.D., Chicago; Assistant Director, American College of Surgeons.
The New Era in Personnel Relations and its Meaning for Hospitals. BRIGADIER GENERAL ROBERT W. JOHNSON, New Brunswick; Chairman, Board of Trustees, Johnson & Johnson.
The Potentialities of the Medical Motion Picture for Teaching Purposes. WARREN H. COLE, M.D., Chicago; Professor of Surgery and Head of the Department, University of Illinois College of Medicine in collaboration with THOMAS JONES, Chicago; Professor Medical Illustration, University of Illinois College of Medicine.
Première Showing: "Anomalies of the Bile Ducts and Blood Vessels; Strictures of the Common Duct."

PRESIDENTIAL MEETING

Monday, 8:15–10:30 p.m.—Grand Ballroom, The Waldorf-Astoria

IRVIN ABELL, M.D., Louisville; President, American College of Surgeons, Presiding.
Processional—Officers, Regents, and Distinguished Guests.
Address of Welcome. HOWARD A. PATTERSON, M.D., New York; Chairman, Committee on Arrangements.
Introduction of Distinguished Guests. ARTHUR W. ALLEN, M.D., Boston; Vice Chairman, Board of Regents.
Address of the Retiring President: The Spirit of Surgery. IRVIN ABELL, M.D., Louisville.
Inauguration of Officers:
Presented by: LELAND S. MCKITTRICK, M.D., Boston; Retiring First Vice President.
President: ARTHUR W. ALLEN, M.D., Boston.
First Vice President: THOMAS E. JONES, M.D., Cleveland.
Second Vice President: GORDON B. NEW, M.D., Rochester, Minnesota.
The Second Martin Memorial Lecture: The Qualifications of the Surgeon and the Cancer Problem. ALLEN O. WHIPPLE, M.D., D.Sc., New York; Clinical Director, Memorial Hospital; Emeritus Valentine Mott Professor of Surgery, Columbia University College of Physicians and Surgeons.
Recessional.

CONVOCATION

Friday, 8:15–10:30 p.m.—Grand Ballroom, The Waldorf-Astoria

ARTHUR W. ALLEN, M.D., Boston; President, American College of Surgeons, Presiding.
Processional: Initiates Officers, Regents, and Distinguished Guests.
Presentation of Initiates for Fellowship. IRVIN ABELL, M.D., Louisville; Chairman, Board of Regents.
Fellowship Pledge. Recital by Initiates.
Conferring of Fellowships by the President. ARTHUR W. ALLEN, M.D., Boston.
Conferring of Honorary Fellowships. The President.
Fellowship Address. ANDREW C. IVY, M.D., Chicago; Vice President, University of Illinois, in charge of Chicago Professional Colleges, and Distinguished Professor of Physiology.
Recessional
Reception by the Officers and Regents for the Initiates and Fellows.

ASSEMBLY OF INITIATES

Friday, 1:45–3:00 p.m.

IRVIN ABELL, M.D., Louisville; Chairman of the Board of Regents, Presiding.
The Program of the American College of Surgeons: Hospital Standardization, Sectional Meetings, Medical Motion Pictures, Library and Literary Research, Graduate Training in Surgery. MALCOLM T. MACEACHERN, M.D., Chicago; Associate Director and Chairman of the Administrative Board.
Fellowship in the American College of Surgeons. IRVIN ABELL, M.D., Louisville.
The Department of Clinical Research of the American College of Surgeons. CHARLES R. BRANCH, M.D., Chicago, Assistant Director.
Qualifications for Fellowship. H. P. SAUNDERS, M.D., Chicago, Assistant Director.

EVENING SCIENTIFIC SESSIONS

GENERAL SURGERY

Symposia

Tuesday, 8:00–10:30 p.m.

The Proper Use of Blood and Blood Plasma

A Permanent Red Cross Transfusion Service. G. FOARD MCGINNES, M.D., Washington.
Blood Bank Organization. PAUL I. HOXWORTH, M.D., Cincinnati.
Reactions to Blood Transfusion and the Rh Factor. LOUIS K. DIAMOND, M.D., Boston.
The Use of Blood and Plasma in Surgery. DALLAS B. PHEMISTER, M.D., Chicago.

Wednesday, 8:00–10:30 p.m.

Fracture Oration. FRANK D. DICKSON, M.D., St. Louis.

Nutritional Requirements in Surgery

Proper Employment of Oral Feeding. EVERETT I. EVANS, M.D., Richmond.
Parenteral Feeding. ROBERT ELMAN, M.D., St. Louis
The Importance of Adequate Supply of Blood and Nourishment for Wound Healing. S. CHAMP LYONS, M.D., New Orleans.

Thursday, 8:00–10:30 p.m.

Hypertension

Fundamental Physiological Considerations. PETER HEINBECKER, M.D., St. Louis.
Indications for Surgery in the Treatment of Hypertension. THOMAS FINDLEY, M.D., New Orleans.
Surgical Procedures in the Treatment of Hypertension. REGINALD H. SMITHWICK, M.D., Boston.
End-Results in the Treatment of Hypertension. CYRUS C. STURGIS, M.D., Ann Arbor.

OPHTHALMOLOGY

Tuesday, 8:00–10:30 p.m.

Epithelial Downgrowth Following Cataract Operation. (Speaker to be announced.)
Local Anesthesia in Ophthalmology. WALTER S. ATKINSON, M.D., Watertown, New York.
Operative Treatment of Vertical Tropias. BRITTAIN F. PAYNE, M.D., New York.
Prevention and Management of Operative Complications During Cataract Extraction. JACK S. GUYTON, M.D., Baltimore.

Thursday, 8:00–10:30 p.m.

Prevention of Infection in Eye Surgery. M. HAYWARD POST, M.D., St. Louis.
Glaucoma Following Cataract Extraction. WILLIAM C. OWENS, M.D., Baltimore
Retinal Detachment. HARVEY E. THORPE, M.D., Pittsburgh.
The Difficult Cataract Extraction. R. TOWNLEY PATON, M.D., New York.

OTORHINOLARYNGOLOGY

Tuesday, 8:00–10:30 p.m.

Bronchiectasis

Relationship of Bronchiectasis to Sinusitis. ROBERT L. GOODALE, M.D., Boston.
The Surgical Aspects of Bronchiectasis. ALTON OCHSNER, M.D., New Orleans.
The Use of Bronchoscopy in Bronchiectasis. FLETCHER D. WOODWARD, M.D., Charlottesville.

Thursday, 8:00–10:30 p.m.

Management of Carcinoma of the Larynx

Treatment by Laryngofissure. CHEVALIER L. JACKSON, M.D., Philadelphia.
Laryngectomy. LOUIS H. CLERF, M.D., Philadelphia.
Management of Carcinoma of the Larynx with Metastatic Involvement of the Neck. HENRY B. ORTON. M.D., Newark.

COMBINED SESSION ON OPHTHALMOLOGY–OTORHINOLARYNGOLOGY

Wednesday, 8:00–10:30 p.m.

Blood Supply of Eye and Sinuses. OSCAR V. BATSON, M.D., Philadelphia.
Dacryocystorhinostomy. HAROLD GIFFORD, Jr., M.D., Omaha.
Sinus Surgery in Eye Diseases. (Speaker to be announced.)
Ophthalmoneurologic Symptoms of Nasopharyngeal Tumors. FRANK B. WALSH, M.D., Baltimore.

FORUM ON FUNDAMENTAL SURGICAL PROBLEMS

Tuesday through Friday, 9:00 a.m. to 12:30 p.m.—The Waldorf-Astoria

Presentation of the results of clinical and experimental research on problems related to general surgery and the surgical specialties which are being currently conducted in many medical schools, clinics, and hospitals.

PANEL DISCUSSIONS

GENERAL SURGERY

Monday, 1:30–3:00 p.m.

Pulmonary Suppuration
Moderator: EVARTS A. GRAHAM, M.D., St. Louis.
Collaborators: BRIAN BLADES, M.D., Washington; RICHARD H. OVERHOLT, M.D., Brookline, Massachusetts; HAROLD NEUHOF, M.D., New York.

Monday, 3:30–5:00 p.m.

Pancreatitis
Moderator: MIMS GAGE, M.D., New Orleans.
Collaborators: JOHN M. WAUGH, M.D., Rochester, Minnesota; HORACE J. MCCORKLE, M.D., San Francisco.

Tuesday, 1:30–3:00 p.m.

Surgery of the Spleen
Moderator: ALLEN O. WHIPPLE, M.D., New York.
Collaborators: GEORGE M. CURTIS, M.D., Columbus; ARTHUR H. BLAKEMORE, M.D., New York; ROBERT H. E. ELLIOTT, M.D., New York; LEWIS M. ROUSSELOT, M.D., New York.

Tuesday, 3:30–5:00 p.m.

Jaundice
Moderator: CHARLES B. PUESTOW, M.D., Chicago.
Collaborators: I. S. RAVDIN, M.D., Philadelphia; JAMES T. PRIESTLY, M.D., Rochester, Minnesota; ROSCOE R. GRAHAM, M.D., Toronto.

Wednesday, 1:30–3:00 p.m.

Gastric Surgery
Moderator: HOWARD K. GRAY, M.D., Rochester, Minnesota.
Collaborators: GEORGE T. PACK, M.D., New York; WARREN H. COLE, M.D., Chicago; LELAND S. MCKITTRICK, M.D., Boston.

Wednesday, 3:30–5:00 p.m.

Use of Antibiotic Agents and Chemotherapy in Surgery
Moderator: JOHN S. LOCKWOOD, M.D., New York.
Collaborators: FRANK L. MELENEY, M.D., New York; C. PHILLIP MILLER, M.D., Chicago; HAROLD A. ZINTEL, M.D., Philadelphia; Major EDWIN J. PULASKI, M.C., Fort Sam Houston, Texas.

Thursday, 3:30–5:00 p.m.

Surgery of the Hand
Moderator: HENRY C. MARBLE, M.D., Boston.
Collaborators: HARVEY S. ALLEN, M.D., Chicago; LAURIE H. MCKIM, M.D., Montreal; J. HAROLD COUCH, M.D., Toronto.

NEUROLOGICAL SURGERY

Friday, 1:30–5:00 p.m.

Late Results of Compound Craniocerebral Injuries
Moderator: A. EARL WALKER, M.D., Chicago.
Collaborators: JAMES C. WHITE, M.D., Boston; COBB PILCHER, M.D., Nashville.

OBSTETRICS AND GYNECOLOGY

Friday, 1:30–5:00 p.m.

Moderator: J. MASON HUNDLEY, JR., M.D., Baltimore
Changes in the Urinary System Engendered by Gynecological and Obstetrical Conditions
Collaborators: (To be announced).
Modern Trends in the Treatment of Malignancies of the Female Genitalia
Collaborators: (To be announced).

ORTHOPEDIC SURGERY

Friday, 1:30–5:00 p.m.

Moderator: PAUL B. MAGNUSON, M.D., Washington.
Evaluation of Reconstruction Operations for Ununited Fractures of the Hip
Collaborators: RUDOLPH S. REICH, M.D., Cleveland; PAUL C. COLONNA, M.D., Philadelphia.
Indications and Operative Technics for Lumbosacral Fusion of the Spine
Collaborators: (To be announced).

PLASTIC SURGERY

Friday, 1:30–5:00 p.m.

Moderator: WILLIAM G. HAMM, M.D., Atlanta.
Repair of Surface Defects of the Extremities
Collaborators: FRANK MCDOWELL, M.D., St. Louis; TRUMAN G. BLOCKER, M.D., Galveston.
Major Facial Defects
Collaborators: BRADFORD CANNON, M.D., Boston; WILLIAM B. DAVIS, M.D., Baltimore; Major ANDREW M. MOORE, M.D., Phoenixville; CARL E. LISCHER, M.D., St. Louis.

THORACIC SURGERY

Friday, 1:30–5:00 p.m

Surgery of the Esophagus
Moderator: STUART W. HARRINGTON, M.D., Rochester, Minnesota.
Collaborators: HERMAN J. MOERSCH, M.D., Rochester, Minnesota; CARL EGGERS, M.D., New York.

UROLOGY

Friday, 1:30–5:00 p.m.

Moderator: CHARLES C. HIGGINS, M.D., Cleveland.
Management of Renal Lithiasis
Collaborators: GEORGE F. CAHILL, M.D., New York; LINWOOD D. KEYSER, M.D., Roanoke.
Treatment of Carcinoma of the Bladder
Collaborators: HUGH J. JEWETT, M.D., Baltimore; ARCHIE L. DEAN, M.D., New York; EDWARD N. COOK, M.D., Rochester, Minnesota.

OPHTHALMOLOGY

Tuesday, 9:00–10:30 a.m.

Surgery of Extraocular Muscles
Moderator: HAROLD W. BROWN, M.D., New York.
Collaborators: RUDOLF AEBLI, M.D., New York; WALTER H. FINK, M.D., Minneapolis.

Wednesday, 9:00–10:30 a.m.

Surgery of Glaucoma

Moderator: C. S. O'Brien, M.D., Iowa City.

Collaborators: P. Robb McDonald, M.D., Philadelphia; John S. McGavic, M.D., Bryn Mawr; Willis S. Knighton, M.D., New York.

Thursday, 9:00–10:30 a.m.

Angiospastic Ocular Lesions

Moderator: (To be announced).

Collaborators: Walter F. Duggan, M.D., Utica; Frank D. Carroll, M.D., New York; Herman Elwyn, M.D., New York

OTORHINOLARYNGOLOGY

Tuesday, 10:45 a.m.–12:15 p.m.

The Use of Antibiotics in Ear, Nose and Throat Surgery

Moderator: Chester S. Keefer, M.D., Boston.

Collaborators: Westley M. Hunt, M.D., New York; Frederick T. Hill, M.D., Waterville, Maine; Leighton F. Johnson, M.D., Boston.

Wednesday, 10:45 a.m.–12:15 p.m.

Rehabilitation of the Larynx in Bilateral Adductor Paralysis of the Vocal Cords

Moderator: Gabriel Tucker, M.D., Philadelphia.

Collaborators: DeGraaf Woodman, M.D., New York; Brien T. King, M.D., Seattle; Albert C. Furstenberg, M.D., Ann Arbor.

Thursday, 10:45 a.m.–12:15 p.m.

Anesthesia for Ear, Nose and Throat Surgery

Moderator: Lloyd H. Mousel, M.D., Washington.

Collaborators: (To be announced).

SYMPOSIUM ON FRACTURES AND OTHER TRAUMAS

Tuesday, 2:00–5:00 p.m.

Robert H. Kennedy, M.D., New York; Chairman, Committee on Fractures and Other Traumas, Presiding.

Appraisal of Present Methods of Treatment

Intracapsular Fractures of the Neck of the Femur. Paul C. Colonna, M.D., Philadelphia; Professor of Orthopedic Surgery, University of Pennsylvania School of Medicine.

Fractures of the Upper Extremity of the Tibia Involving the Knee Joint. Edwin F. Cave, M.D., Boston; Instructor in Orthopedic Surgery, Harvard Medical School.

Injuries of the Intervertebral Disc. Frank H. Mayfield, M.D., Cincinnati; Assistant in Clinical Surgery, University of Cincinnati College of Medicine.

Fractures of the Os Calcis. James J. Callahan, M.D., Chicago; Professor, Bone and Joint Surgery, Loyola University School of Medicine.

Bone Plates and Screws. Robert H. Kennedy, M.D., New York; Associate Clinical Professor of Surgery, Columbia University College of Physicians and Surgeons.

SYMPOSIUM ON GRADUATE TRAINING IN SURGERY AND THE SURGICAL SPECIALTIES

Thursday, 3:30–5:30 p.m.

Moderator: Dallas B. Phemister, M.D., Chicago; Professor and Chairman, Department of Surgery, Chicago; Surgeon, University of Chicago Clinics; Chairman, Graduate Training Committee, American College of Surgeons.

Centralized Plan of Graduate Training in Surgery, Max M. Zinninger, M.D., Cincinnati; Professor of Surgery, University of Cincinnati College of Medicine.

Graduate Training from the Standpoint of Decentralized Residency Training in Hospitals Affiliated with a Medical School. Albert C. Furstenberg, M.D., Ann Arbor; Professor of Otolaryngology, Dean, University of Michigan Medical School.

The Place of the Organized Clinic in Graduate Training in Surgery. Richard B. Cattell, M.D., Boston; Surgeon, Lahey Clinic.

Graduate Training in General Surgery and the Surgical Specialties in a Veterans Hospital. Charles B. Puestow, M.D., Chicago; Clinical Professor of Surgery, University of Illinois College of Medicine.

Discussion: Opened by Frederick A. Coller, M.D., Ann Arbor; Chairman of the Committee on Relations of the American College of Surgeons with American Boards of Surgery; and Fraser D. Gurd, M.D., Montreal; Professor of Surgery, Magill University Faculty of Medicine.

HOSPITAL STANDARDIZATION CONFERENCE

GENERAL ASSEMBLY: JOINT SESSION—SURGEONS AND HOSPITAL REPRESENTATIVES

Monday, 10:00 a.m.–12:30 p.m. (See program on preceding pages.)

PANEL DISCUSSION—CURRENT PROBLEMS IN MEDICAL SERVICE IN HOSPITALS

Monday, 2:00–5:00 p.m.—Sert Room—First Floor—The Waldorf-Astoria

Conducted by JOSEPH TURNER, M.D., New York, Director, Mount Sinai Hospital.

Integration of the General Practitioner in the Hospital Medical Staff Organization. HARRY R. MENDELSOHN, M.D., Cincinnati; President, The Society of General Physicians.

The Professional Audit to Control Efficiency. FREDERICK T. HILL, M.D. Waterville, Maine; Medical Director, Thayer Hospital.

What is Major and Minor Surgery? Who Should be Permitted to do Major Surgery in an Approved Hospital? J. J. GOLUB, M.D., New York; Director, Hospital for Joint Diseases.

Medical Staff Conferences Essential to Medical Progress and Good Care of the Patient. JOSEPH C. DOANE, M.D., Philadelphia; Medical Director, Jewish Hospital and Professor of Clinical Medicine, Temple University Medical School; Professor of Medicine, Graduate School of Medicine, University of Pennsylvania.

Round Table Conference on Medical Staff Problems. Moderator: EVERETT W. JONES, Chicago; Vice-President, Modern Hospital Publishing Company.

8:00–10:30 p.m.—Ballroom—Fourth Floor—The Waldorf Astoria
Presidential Meeting

Hospital representatives attending the Twenty-Sixth Annual Hospital Standardization Conference are most cordially invited to attend the Presidential Meeting.

PANEL DISCUSSION—IMPROVING FOOD SERVICE IN HOSPITALS

Tuesday, 9:30 a.m.–12:30 p.m.— East Ballroom—Hotel Commodore

Conducted by MARGARET GILLAM, Chicago; Dietary Consultant, American Hospital Association.

New Developments in the Field of Nutrition and How They Affect Food Service and the Care of the Surgical Patient. ROBERT ELMAN, M.D., St. Louis; Professor of Clinical Surgery, Washington University School of Medicine.

New Equipment and Methods to Relieve Problems of Food Service Conducive to Complaints and Dissatisfaction on the Part of the Patient. EVERETT W. JONES, Chicago; Vice-President, The Modern Hospital Publishing Company.

Food Service an Important Factor in Personnel and Public Relations. PAUL H. FESLER, Oklahoma City; Administrator, University of Oklahoma Hospitals.

The Importance of Good Interdepartmental Relations of the Dietary Department and How They can be Improved. ANTHONY W. ECKERT, Neptune, New Jersey; Administrator, Fitkin Memorial Hospital.

Personnel Problems in the Dietary Department. ALLIENE E. MOSSO, New York; Chief Dietitian, St. Luke's Hospital.

Question and Answer Period.

Problems of Food Service in Hospitals.

PANEL DISCUSSION—IMPROVING NURSING SERVICE IN HOSPITALS

Tuesday, 2:00–5:00 p.m.—Sert Room—First Floor—The Waldorf-Astoria

Conducted by CLAUDE W. MUNGER, M.D., New York; Director, St. Luke's Hospital and Professor of Hospital Administration, Columbia University.

Report of Survey Made by American College of Surgeons on use of Nurses' Aides. HOWARD C. NAFFZIGER, M.D., San Francisco; Professor of Surgery, University of California Medical School; Surgeon-in-Chief, University Hospital.

Student Nurse Recruitment—the 1947 Campaign and the 1948 Prospects. MILDRED RIESE, R.N., Detroit; Superintendent, Children's Hospital, Detroit, Chairman, Student Nurse Recruitment Committee, American Hospital Association.

Utilization and Training of Practical Nurses and Auxiliary Workers. ELISABETH C. PHILLIPS, R.N., Rochester, New York: Chairman, Joint Committee on Auxiliary Nursing Service.

How Hospitals Can Help in Student and Practical Nurse Recruitment. EMILY K. JOHNSON, New York; Public Relations Associate, American Nurses' Association.

Correlation of the Services of the Graduate Nurse, the Practical Nurse, and the Nurses' Aide. EDWARD M. BERNECKER, M.D., New York; Commissioner, Department of Hospitals, City of New York.

Question and Answer Period.

JOINT SESSION FOR HOSPITAL TRUSTEES, MEDICAL STAFF OFFICERS, AND ADMINISTRATORS

Tuesday, 8:00–10:30 p.m.—Sert Room—First Floor—The Waldorf-Astoria

RAYMOND P. SLOAN, New York; Editor, The Modern Hospital, Presiding.

Statement by the Chairman, RAYMOND P. SLOAN.

Working Together—Hospital Trustees, Members of the Medical Staff and the Administrator, Must Co-operate in Assuring Good Care of the Patient in the Hospital. JOHN H. HAYES, New York; Superintendent, Lenox Hill Hospital; President, American Hospital Association.

Regionalization of Hospitals. EDWARD J. NOBLE, New York; Chairman of the Board, American Broadcasting Company, and Chairman, Life Savers Corporation.

The Hospital Trustee Self Analysis—Do I as a Trustee Know that my Hospital Lives up to the Standards set down by the American College of Surgeons and Carries on Effectively the Four Primary Functions of the Hospital. WILLIAM HENRY JACKSON, New York; President, New York Hospital.

A New Era in the Education and Training of Hospital Administrators. CLAUDE W. MUNGER, M.D., New York; Superintendent, St. Luke's Hospital; Professor of Hospital Administration, Columbia University.

PANEL DISCUSSION—PERSONNEL RELATIONS AND PUBLIC RELATIONS

Wednesday, 9:30 a.m.–12:30 p.m.—Sert Room—First Floor—The Waldorf-Astoria

Conducted by FRANK R. BRADLEY, M.D., St. Louis; Director, Barnes Hospital; President, American College of Hospital Administrators.

Better People Make Better Hospitals—Good Personnel Relations Can Improve Quality of Personnel. EDGAR C. HAYHOW, East Orange, New Jersey; Director, East Orange General Hospital; President-Elect, American College of Hospital Administrators.

Personnel Relations Affect Public Relations. OLIVER G. PRATT, Providence; Executive Director, Rhode Island Hospital.

Why Every Hospital Should Have—(a) A Personnel Director and Definite Personnel Policies, (b) Some Person Definitely Assigned Over-all Responsibility for Public Relations. FRASER D. MOONEY, M.D., Buffalo; Superintendent, Buffalo General Hospital; Associate in Medicine, University of Buffalo School of Medicine.

Orientation and Training of Hospital Personnel. MARY JOHNSON, Ph.D., New York; Research Associate, Program in Hospital Administration, Columbia University.

Why Hospitals Must Consciously Enter Competition for the Public's Attention and What Means They Can Ethically Employ. CORNELIUS M. SMITH, New York; President, Will, Folsom and Smith.

Round Table Conference on Media for Informing the Public Regarding Hospitals.

Newspapers	Films and Slides
Radio	Forums and Talks
Hospital Publications (5)	Tours and Demonstrations

Conducted by JOHN GORRELL, M.D., New York; Associate Professor of Hospital Administration, Columbia University.

PANEL DISCUSSION—IMPROVING MEDICAL RECORDS IN HOSPITALS—JOINT SESSION WITH THE AMERICAN ASSOCIATION OF MEDICAL RECORD LIBRARIANS

Wednesday, 2:00–5:00 p.m.—Sert Room—First Floor—The Waldorf-Astoria

Conducted by ROBIN C. BUERKI, M.D., Philadelphia; Director of Hospitals, University of Pennsylvania; Dean, Graduate School of Medicine.

A Message from the President of the American Association of Medical Record Librarians. ENNA C. BLACK, R.R.L., New Haven; Medical Record Librarian, Grace Unit, Grace-New Haven Hospital; President of the American Association of Medical Record Librarians.

The Present Status of Training Medical Record Librarians Through—

(a) Approved Schools. EDNA K. HUFFMAN, R.R.L., Chicago; Chief Medical Record Librarian, Wesley Memorial Hospital; Director, Program in Medical Record Science, Northwestern University.

(b) In Service Training Institutes. MARGARET C. TAYLOR, R.R.L., Chicago; Field Instructor In-Service Extension Courses, American Hospital Association.

The Problems of the Supply and Demand for Medical Record Librarians in Hospitals. ADALINE C. HAYDEN, R.R.L., Chicago; Executive Secretary, American Association of Medical Record Librarians.

The Proper Approach to the Maintaining of Adequate Medical Records. MARGARET DUBOIS, M.D., Richmond; Assistant Director, Hospital Division, and Associate Professor of Hospital Administration, Medical College of Virginia School of Medicine.

The Responsibility of the Medical Staff of the Hospital in Maintaining Good Medical Records. MALCOLM T. MACEACHERN, M.D., Chicago; Associate Director, American College of Surgeons.

Impressions of the Field Representative of the American College of Surgeons in Regard to Maintaining Adequate Medical Records. REAR ADMIRAL LUCIUS W. JOHNSON, San Diego; Assistant, Hospital Department, Assigned to Pacific Region.

Question and Answer Period.

A FORUM ON TRENDS IN HOSPITAL ADMINISTRATION, NEW IDEAS AND PROCEDURES, AND SPECIAL HOSPITAL PROBLEMS

Wednesday, 8:00–10:30 p.m.—Sert Room—First Floor—The Waldorf-Astoria

Participation in the Forum on Hospital Trends, New Ideas, New Procedures and Special Hospital Problems will be on a voluntary basis, that is, those having something to contribute will please communicate with:
Dr. Malcolm T. MacEachern, Associate Director
American College of Surgeons, Chicago
Discussion Leader: LEO M. LYONS, Chicago; Director, St. Luke's Hospital.
Ten minutes will be allowed each participant.

FORUM ON SPECIAL PROBLEMS

Thursday, 9:30 a.m —12:30 p.m.—Sert Room—First Floor—The Waldorf-Astoria

Coordinators: ROBIN C. BUERKI, M.D., Philadelphia; Director of Hospitals, University of Pennsylvania; Dean, Graduate School of Medicine; and EVERETT W. JONES, Chicago; Vice-President, The Modern Hospital Publishing Company.
Topics for Discussion:
The Modern Hospital—a Complete Synchronized Entity. New Developments in Each Group of Departments that Provide Unified Service to the Patient.
What Has Been Done to Meet the Present Acute Bed Shortage?
Present Status of Volunteer Workers in Hospitals.
Hospital Trustees, Members of the Medical Staff, Nursing Executives and Administrators Must Cooperate in Better Nursing Relations.
Are We Making Progress in the Care of the Chronically Ill?
Hospitals and the Cancer Problem—Cancer Clinics and Cancer Detection Centers.
Newer Services for the Modern Hospital—Physical Medicine and Geriatrics.
Planned Convalescence and its Place in the Community.
Adjusting Hospital Service to Medical Progress.
Interdepartmental Relations of the Pharmacy; How to Enhance its Value and Appreciation by other Departments in the Hospital.
The Enlarging Educational Responsibilities of the Hospital.
Proper Use of the Medical Library.
Incentives to Hold Employees—Including Retirement Plans.
Collaborators:
(To be listed later.)

ROUND TABLE CONFERENCE—SPECIAL PROBLEMS OF THE SMALL HOSPITAL IN MEETING THE STANDARDS OF THE AMERICAN COLLEGE OF SURGEONS

Thursday, 2:00–5:00 p.m.—Sert Room—First Floor—The Waldorf-Astoria

Conducted by HARVEY AGNEW, M.D., Toronto; Secretary, Canadian Hospital Council; Editor of *Canadian Hospitals*.
Topics for Discussion:

Medical Staff Organization	Food Service
Clinical Laboratory	Pharmacy Service
X-ray Service	Personnel Management
Medical Records	Public Relations
Nursing Service	Care of Emergencies

Collaborators:
ALLAN CRAIG, M.D., New York; Hospital Consultant.
JANE S. DAVIS, M.H.A., Niles, Michigan; Superintendent, Pawating Hospital.
EVA H. ERICKSON, M.H.A.; Olean, New York; Superintendent, Olean General Hospital.
ELOISE B. FURNIVAL, M.H.A.; Syracuse; Administrative Assistant, Syracuse Memorial Hospital.
WILLIAM C. ILLINGER, White Plains, New York; Administrator, White Plains Hospital.
GEORGE PECK, Philadelphia; Administrator, Jewish Hospital.
MARSHALL I. PICKENS, Charlotte; Assistant Secretary, The Duke Endowment.
WILLIAM P. SLOVER, Manchester, Connecticut; Superintendent, Manchester Memorial Hospital.
ISABELLA N. WILLIAMS, Norwich, New York; Administrator, Chenango Memorial Hospital.
ROBERT G. WHITTON, Alexandria; Administrator Alexandria Hospital; President, The Hospital Council of the National Capital Area.

SPECIAL CONFERENCE ON THE POINT RATING SYSTEM

Thursday, 8:00–10:00 p.m.—Sert Room—First Floor—The Waldorf-Astoria

A Special Conference on the Point Rating System for Hospitals with Particular Discussion of Evaluation and Rating of Hospitals Under this system.
Conducted by: HARVEY AGNEW, M.D., Toronto; Secretary Canadian Hospital Council, and HENRY G. FARISH, M.H.A., M.D., Chicago; Assistant, Hospital Department, American College of Surgeons.

PRELIMINARY CLINICAL PROGRAM

CLINICS IN NEW YORK HOSPITALS

Monday

BELLEVUE HOSPITAL—THIRD (NEW YORK UNIVERSITY) SURGICAL DIVISION

Radiology—Demonstrations. (I & K Building, Ground Floor). IRA I. KAPLAN and STAFF. The Radiologic Treatment of Benign and Malignant Superficial Lesions—Irradiation Alone and as an Adjunct to Surgery

9:00–4:00. *Roentgenology*—Roentgen Demonstrations of Surgical Diseases. LEWIS J. FRIEDMAN and STAFF (I & K Building, Ground Floor).

Surgical Lesions of the Small Bowel Roentgenologically Considered. J. BUCKSTEIN.

Surgical Problems of the Chest. P. STRAX.

Diagnostic Problems in Osseous Disease. M. ZURROW.

Diagnosis of Renal Surgical Disease. H. ZUKERMAN.

Interesting Neurosurgical Cases. LEWIS J. FRIEDMAN, HERBERT LOBENZ.

BELLEVUE HOSPITAL—FOURTH (NEW YORK UNIVERSITY) SURGICAL DIVISION

1:30–3:30. *Surgery, Specialties.* (Operating Rooms K-5 & K-6).

Children's Surgery—Hernia. PHILIP ALLEN (Operating Room A).

Children's Surgery—Chest. CHARLES W. LESTER (Operating Room B).

Maxillofacial Surgery—Surgical Correction of Prognathism of the Mandible. LEO WINTER (Operating Room C).

Orthopedic Surgical Clinic. ARTHUR KRIDA, JOHN MCCAULEY (Bone Room K-6).

BETH ISRAEL HOSPITAL

2:00–5:00. *Otorhinolaryngology.* Clinical Demonstration of Endoscopic Treatment and Results. MAX SOM and STAFF.

2:00–5:00. *Ophthalmology.* GRESSER and STAFF.

FLOWER AND FIFTH AVENUE HOSPITALS

2:00–4:00. *Neurosurgery.* "Slipped Disc" Operation and End-Results. THOMAS I. HOEN.

4:00–5:00. *Thoracic Surgery.* Trauma to Neck Involving the Mediastinum—or—Mediastinal Tumors. MILTON J. LLOYD.

HARLEM HOSPITAL

2:00–5:00. Symposium on Burns and Plastic Surgery. F. X. TIMONEY, J. A. TAMERIN, A. GARNES and STAFF.

HOSPITAL FOR JOINT DISEASES

9:00–12:00. *General Surgery.* Operative Clinic: Tendon Transplantation on the Hand. Transpositional Osteotomy at the Hip. LEO MAYER, HENRY MILCH. Follow-up Demonstration:

1. Result of Hallux Valgus Operation. PAUL LAPIDUS.
2. (a) Transplantation of Extensor Carpi Ulnaris Tendon to Give Abduction of the Thumb; (b) Meniscectomy of the Temporomandibular Joint; (c) Fracture of Xiphoid-Xiphoidectomy; (d) Osteotomy Fusion of Hip. MICHAEL BURMAN.
3. (a) Slipping of the Femoral Epiphysis and Results by the Use of Internal Rotation Brace; (b) Result of Osteotomy at the Hip Combined with Resection of Femoral Head. HENRY MILCH.
4. (a) Case Illustrating the Results of Tendon Transplantations and Nerve Suture; (b) Cases Illustrating Surgery of the Hand.

2:00–4:00. *General Surgery.* Operative Clinic: Surgery of the Hand. LEO MAYER.

2:00–4:00. *Otorhinolaryngology.* Operative Clinic: Nose and Throat Surgery. L. KLEINFELD.

LYING-IN HOSPITAL

(See New York Hospital)

MANHATTAN EYE, EAR AND THROAT HOSPITAL

2:00– . *Ophthalmology.* Demonstration: Slit Lamp Demonstration. G. BONACCOLTO.

Demonstration: Corneal Grafting Technique on Rabbits. H. M. KATZIN.

2:00– . *Otolaryngology.* Demonstration: Biplane Fluoroscopy and Laminagraphy. W. R. CASHION.

3:00– . *Ophthalmology.* Demonstration: Cases of Cataract Surgery Complicated by Glaucoma. M. A. LAST.

METROPOLITAN HOSPITAL

2:00–4:00. *Neurosurgery.* Peripheral Vascular Clinic Including Sympathectomy. LOUIS R. KAUFMAN, S. THOMAS GLASSER, ALBERT LESSER, KENNETH C. PEACOCK, DAVID SCHERF.

MONTEFIORE HOSPITAL

2:00–4:00. *General Surgery.* Nonoperative Clinic: SAMUEL STANDARD and STAFF.

4:00–5:00. *General Surgery.* Nonoperative Clinic: Neoplastic Diseases. DANIEL LASZLO.

MOUNT SINAI HOSPITAL

8:30–12:00. *Gynecology.* Operative and Nonoperative Clinic: (Surgical Amphitheatre).

Parametrial Fixation Operation (Fothergill). Surgical Treatment of Urinary Stress Incontinence with Tantalum Plate. M. A. GOLDBERGER.

Conservative Surgery for Pelvic Endometriosis. JOSEPH GAINES.

The Value of the Twenty-four Hour Pregnancy Test: A Review of 500 cases. EMANUEL KLEMPNER.

The Clinical Value of Hysterography. ARTHUR DAVIDS.

The Management of the Menopause. ROBERT I. WALTER.

NEW YORK EYE AND EAR INFIRMARY

2:00–3:30. *Otorhinolaryngology.* Nonoperative Clinic: Frontal and Ethmoid Sinusitis—Preoperative and Follow-up.

2:00–3:30. *Otorhinolaryngology.* Nonoperative Clinic: Antral Sinusitis—Preoperative and Follow-up. EARL F. LIMBACK.

4:00–6:00. *Otorhinolaryngology.* Operative Clinic: Sinus Surgery. STUART L. CRAIG.

See the "Daily Clinical Bulletin" for Final Program.

4:00–6:00. *Otorhinolaryngology.* Operative Clinic: Surgery of the Antrum.

. *Ophthalmology.* Nonoperative Clinic: Preoperative Diagnostic Study. BERENS, ROMAINE and ASSOCIATES.

Preoperative and Postoperative Glaucoma Studies. KNIGHTON, ELWYN and ASSOCIATES.

Plastic Surgery Methods. HUGHES, COLE and ASSOCIATES.

Special Lenses—Contact, Aniseikonic and Telescopic.

The routine clinics of the New York Eye and Ear Infirmary will be held as usual during this period; all Fellows of the American College of Surgeons are cordially invited to attend.

NEW YORK HOSPITAL

10:00–12:00. *Genitourinary Surgery.* Demonstration: Surgical Anatomy. ERNEST LAMPE.

2:00– . *General Surgery.* Demonstration: Surgical Anatomy. Detailed Anatomy of Radical Neck Dissection. ERNEST LAMPE.

2:00– . *Otolaryngology.* Operative Clinic: Reconstructive Surgery of the Nose. ARTHUR PALMER.

NEW YORK HOSPITAL
LYING-IN HOSPITAL

. Lying-In Hospital Staff Conference.

NEW YORK ORTHOPEDIC DISPENSARY AND HOSPITAL

8:00– . *Orthopedic Surgery.* Operative Clinic. ALAN DE FOREST SMITH and STAFF. (Capacity 16)

1:30– . *Orthopedic Surgery.* General Orthopedic Clinic. HALFORD HALLOCK and STAFF.

Congenital Club Foot Clinic. JOHN MCCAULEY.

NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL

9:00–11:00. *General Surgery.* Operative Clinic (Amphitheatre, 6th Floor): Diseases of Gall Bladder and Bile Ducts.

11:00–12:00. *General Surgery.* Nonoperative Clinic (Erdmann Auditorium): Follow-up Results.

2:00–5:00. *General Surgery.* Operative Clinic (Amphitheatre, 6th Floor).

CLINICS IN BROOKLYN—LONG ISLAND HOSPITALS

Monday

PRESBYTERIAN HOSPITAL

2:00–4:00. *General Surgery.* Nonoperative Clinic: Carcinoma of the Tongue at a General Hospital, Analyses of 100 cases. JOHN M. HANFORD.

Lymphatic Spread of Carcinoma of the Rectum and Colon. ROBERT S. GRINNELL.

Roentgen Diagnosis of Carcinoma of the Stomach. ROSS GOLDEN.

Extent of Resection of Stomach for Carcinoma, Correlation with Experimental Mucus Transformation. Case Demonstration. EDWARD L. HOWES.

Chemotherapy of Malignancy with Nitrogen Mustard. ALFRED GELLHORN.

Surgical Anatomy: Demonstration of Autonomic Nerve Supply of the Gastrointestinal Tract. JOSE FERRER.

Structure of the Female Perineum. PHILIP WIEDELL.

PRESBYTERIAN-NEW YORK ORTHOPEDIC HOSPITALS

Fracture Service

1:30–4:00. *Fractures and Traumatic Surgery.* Fracture Clinic: The Low Back Problem. SAWNIE R. GASTON.

Three, Four, and Five Year Hip Fracture Follow-up Results. CHARLES S. NEER.

ROOSEVELT HOSPITAL

2:00– . *Discussion.* Post-Graduate Education of the Surgical Residents and Interns. CHARLES F. STEWART.

2:30– . *Fractures and Traumatic Surgery.* Traumatic and Reconstructive Surgery of the Hand.

The Early Treatment of Hand Injuries (Emergency Treatment). CONDICT W. CUTLER.

The Repair of Finger Tip Injuries. HENRY A. KINGSBURY.

The Temporary Repair of Severed Flexor Tendons of the Fingers. R. STERLING MUELLER.

Reconstructive Surgery of the Hand. WILLIAM LITTLER.

St. LUKE'S HOSPITAL

8:30–11:00. *General Surgery.* Operative Clinic. WILLIAM MACFEE and STAFF.

11:00–1:00. *General Surgery.* Clinical Demonstrations: Neurofibromas of Stomach, six cases. JOHN WEST.

Management of Polyps of Colon and Rectum. PAUL MORTON.

Adenocarcinoma of Colon and Rectum with Metastasis to Ovaries, illustrative cases. WILLIAM BERRY.

Malignant Tumors of the Appendix. STAFFORD WEARN.

2:00–5:00. *Orthopedic Surgery.* Operative Clinic. MATHER CLEVELAND and STAFF.

ST. VINCENT'S HOSPITAL

9:00– . *General Surgery.* Operative Clinic. RAYMOND P. SULLIVAN, JOHN A. LAWLER and GEORGE R. STUART, EDWARD DENNEEN.

9:00– . *Thoracic Surgery.* Group Conference: Selection of Cases for Thoracoplasty, Lobectomy and Pneumonectomy. DANIEL MULVIHILL.

9:00– . *Radiology.* Nonoperative Clinic: Roentgen Diagnosis of Thoracic Tumors. WILLIAM W. MAYER and ASSOCIATES.

10:00– . *Neurosurgery.* Nonoperative Clinic: Follow-up Study of a Series of Herniated Discs with Fusion of Spine. JAMES T. DANIELS, ANTHONY PISANI.

2:00– . *Pathology.* Clinical Pathological Demonstration of Hodgkin's Disease. ANTHONY ROTTINO, JOHN KEATING, WILLIAM F. MEEHAN.

Growth of Tissue Anterior Chamber of the Eye of Mice.

Display and Demonstration of System Diseases by Kodachrome Slides.

Display of Fixed Specimens.

VETERANS ADMINISTRATION HOSPITAL

1:00– . General Surgical Conference. FREDERIC W. BANCROFT, FORDYCE B. ST. JOHN, ALLEN O. WHIPPLE,

P. K. Sauer, Carnes Weeks, John E. Sullivan, Edwin Self, David K. Pinks, Martin J. Healy, and Resident Staff.

2:00– . *General Surgery.* Endoscopy. David H. Jones, Henry Thaler.

3:30– . *Radiology.* Radiological Conference. Charles Gottlieb, Archie Sheinmel, Maxwell H. Poppel, and Staff.

EXHIBITS

Anesthesia Section
Bronchogenic Carcinoma: Review of 600 Cases
Intracranial Neoplasms
Residency Training Program
Organization of Surgical Division
Results of Vagus Resection
Pathology Section
Medical Illustrations Laboratory
Plastic Surgery
Prosthetic Appliances

CUMBERLAND HOSPITAL

2:00–5:00. *General Surgery.* Discussion of Postoperative Complications. David J. Graubard.

Use of Sulfonamides in Acute Abdomen. Michael Veneziano.

Preoperative and Postoperative Treatment in Gastrointestinal Surgery. Harvey Cooperman.

Advantage of Miller Abbott Tube in Small Bowel Obstruction. Cesaro Castellaneta.

Late Results in Surgery of Gastrointestinal Malignancy with Pathological Demonstration. Harold Axelrod.

METHODIST HOSPITAL

2:00–4:00. *Plastic Surgery.* Operative and Nonoperative Clinic. John F. Ford.

2:00–5:00. *Otolaryngology.* Operative and Nonoperative Clinic. Charles A. Anderson, Einer A. Sunde and Staff.

CLINICS IN NEW YORK HOSPITALS

Tuesday

BABIES HOSPITAL

(See Presbyterian Hospital)

BELLEVUE HOSPITAL—FIRST (COLUMBIA UNIVERSITY) SURGICAL DIVISION

8:00–10:00. *General Surgery.* Operative Clinic: Frank B. Berry and Staff (Operating Rooms A, B, C and D; Operating Rooms K-5 & K-6).

8:00–12:00. *Thoracic Surgery.* Operative Clinic: Frank B. Berry and Staff (Operating Rooms C and D)

10:30–12:30. *Nonoperative Clinic* (Stewart Amphitheatre I & K Building, Ground Floor):

Surgical Treatment of Hypertension. Carnes Weeks.

Chronic Thyroiditis. J. Gordon Lee.

Enterogenous Cysts. James F. Bagg.

Treatment of Chronic Leg Ulcers by Fasciotomy. Bernard J. Ryan.

Preliminary Report of a Method to Study Peripheral Arterial Diseases. Aaron Himmelstein.

BELLEVUE HOSPITAL—THIRD (NEW YORK UNIVERSITY) SURGICAL DIVISION

Radiology. Demonstrations: The Place of Irradiation in the Treatment of Carcinoma of the Breast. Ira I. Kaplan and Staff (I & K Building, Ground Floor).

8:00–12:00. *Anesthesia.* Demonstration: Anesthesia in Thoracic Surgery. E. A. Rovenstine and Staff. (C & D Operating Rooms, 5th Floor, C & D Building).

9:00–4:00. *Roentgenology.* Roentgen Demonstrations of Surgical Diseases. Lewis J. Friedman and Staff (I & K Building, Ground Floor).

Surgical Lesions of the Small Bowel Roentgenologically Considered. J. Buckstein.

Surgical Problems of the Chest. P. Strax.

Diagnostic Problems in Osseous Disease. M. Zurrow.

Diagnosis of Renal Surgical Disease. H. Zukerman.

Interesting Neurosurgical Cases. Lewis J. Friedman, Herbert Lobenz.

BETH ISRAEL HOSPITAL

9:00–12:00. *Plastic Surgery.* Arthur K. Barsky.

2:00–5:00. *Genitourinary Surgery.* Operative and Nonoperative Clinic. Seymour Wilhelm and Staff.

FLOWER AND FIFTH AVENUE HOSPITALS

9:00–11:00. *Breast Surgery.* Herbert C. Chase.

11:00–12:00. *Tumor Clinic.* George T. Pack, John O. Vieta, George K. Higgins, Frank J. Borelli.

Biological Studies in Malignancy. I. S. Kleiner, M. M. Black.

2:00–4:00. *Thoracic Surgery.* Samuel A. Thompson.

4:00–5:00. *Obstetrics.* Mannequin (Ayers Forceps, etc.)—or—Ovarian Transplants. Benjamin Toly.

GOLDWATER MEMORIAL HOSPITAL—SECOND SURGICAL DIVISION

9:30–10:30. *Geriatric Surgery.* Operative Clinic:

Adductor Tenotomy and Obturator Nerve Section for Adductor Spasm.

Repair of Scrotal Hernia; Local Anesthesia.

Amputation of Leg for Arteriosclerotic Gangrene; Refrigeration Anesthesia.

10:30–1:00. *Geriatric Surgery.* Case Presentations:

Anesthesia Methods in Bad Risk Patients. E. A. Rovenstine.

Clinical Studies in Chronic Peripheral Vascular Occlusion. Grant P. Pennoyer.

Indications and Results of Hernia Repair in Old Patients. George Strenger

Problems in Chemical Balance in Geriatric Surgery. Louis Carp.

Dicoumarol and Other Anticoagulant Drugs. W. E. Alsop.

Treatment of Chronic Bone Suppuration. Roth.

Cholecystitis Complicating Chronic Disease States. Medl.

Urgent Surgery in the Aged. Condict W. Cutler, Jr.

Clinical Pathological Demonstration. Rosenthal.

2:00–4:00. *Geriatric Surgery.* Case Presentations:

Arachnoiditis. Oljenick.

Clinical Evaluation of Cystometric Readings. Begner.

Preliminary Report on the Experimental Studies of Obstruction at the Vesical Neck Complicating the Neurogenic Bladder. Sporer.

Vesical Neck Obstruction in the Female. Shifrin.

Treatment of Incontinence in a Hospital for Chronic Diseases. Soifer.

Suprapubic Prostatectomy, Modified Harris Technique with Complete Closure. Ritter.

Ward Rounds.

HARLEM HOSPITAL

9:00–12:00. *Trauma Symposium* and Ward Rounds: Injuries of the Chest and Abdomen. R. H. YOUNG, J. C. WHITAKER, R. S. WILKINSON, M. LOGAN, F. R. ALLEN.

2:00–3:00. *Genitourinary* Conference, Ward Rounds, and Operative Clinic. N. F. LASKEY, E. DONHEISER and STAFF.

3:00–5:00. *Roentgenology* in Surgery.
Regional Ileitis—Intestinal Obstruction. L. GINSBURG
Duodenal Loop Triad. WILLIAM SNOW.

HOSPITAL FOR JOINT DISEASES

9:00–12:00. *Orthopedic Surgery*. Operative Clinic: Spine Fusion for Scoliosis. Saucerization for Chronic Osteomyelitis.
Nonoperative Clinic: Miller Operation for Flat Feet. Use of Penicillin in the Operative Treatment of Chronic Osteomyelitis. The Operative Treatment of Cavus. Drilling of Incipient Epiphyseolisthesis at the Hip. SAMUEL KLEINBERG, JOSEPH BUCHMAN, THOMAS HORWITZ.

2:00–4:00. *Orthopedic Surgery*. Specimen Demonstration: The Pathology of Bones and Joints. HENRY JAFFE.

2:00–4:00. *Gynecology*. Operative Clinic: Total Hysterectomy for Uterine Tumors. Nonoperative Clinic: Follow-up Results of Total Hysterectomy for Uterine Tumors. HAROLD DAVIDSON.

HOSPITAL FOR SPECIAL SURGERY

8:30–12:00. *General Surgery*. Operations by General Surgical Department.

9:00–12:00. *Orthopedic Surgery*. Children's Orthopedic Problems.

2:00–5:00. *Orthopedic Surgery*. Operative and Nonoperative Clinic—Knee Problems:
Knee Capsuloplasty. LEWIS CLARK WAGNER.
Quadricepsplasty to Improve Knee Function. T. CAMPBELL THOMPSON.
Conservative Treatment of Fractures of the Tibial Plateau. ROBERT LEE PATTERSON.
Unusual Pathological Conditions Found in Knee Joints. MILTON HELPERN.
Old Pathological Fractures of Femora Treated with Knutschner Nail. JOHN R. COBB.

LYING-IN HOSPITAL

(See New York Hospital)

MANHATTAN EYE, EAR AND THROAT HOSPITAL

9:00– *Ophthalmology*. Operative Clinic: Surgical Treatment of Ptosis of Lids, GUERNSEY FREY.

9:00– *Otolaryngology*. Operative Clinic. Nasal Plastic Operation. A. SCHATTNER.

10:00– *Otolaryngology*. Demonstration. Postoperative Cases of Laryngectomy; Esophageal Voice Training. D. S. CUNNING.

2:00– *Ophthalmology*. Operative Clinic: Surgical Treatment of Strabismus, Operations and End-Results. F. C. KEIL.

2:00– *Ophthalmology*. Orthoptic Clinic. F. C. KEIL, JR., E. KNAUBER.

2:00– *Otolaryngology*. Operative Clinic: Laryngectomy. D. S. CUNNING.

2:30– *Otorhinolaryngology*. Operative Clinic: Nasal Plastic Operation. WILLIAM B. ALLAN.

3:00– *Otolaryngology*. Clinicopathological Demonstration: Malignancy of the Larynx. A. A. EGGSTON, D. S. CUNNING.

MEMORIAL HOSPITAL

8:00–12:00. *Operative Clinics*.

2:00–3:00. *Tumor Surgery*. Discussion.
The Memorial Hospital Nomenclature for Cancer and Its Usefulness in Cancer Hospitals, Cancer Clinics, and Cancer Commissions. ELEANOR MACDONALD.
The Necessity for Uniform and Accurate Methods of Reporting Cancer Statistics; Cure Rates in Cancer Based Upon Total Experience. HAYES MARTIN.
The Organization of the Statistics Department of Memorial Hospital and a Report of Five-year End-Results in Various Anatomic Forms of Cancer as Calculated by the Statistics Department to Date. MARY MACDONALD.

3:00–4:00. *Tumor Surgery*. Nonoperative Clinic: Follow-up Patients With Total Laryngectomy for Cancer of the Larynx.

4:00–5:00. *Tumor Surgery*. Follow-up Patients Illustrating Combined Neck Dissection and Excision of Primary Lesions of the Mouth.

METROPOLITAN HOSPITAL

9:00–12:00. *General Surgery*. Thyroid Surgery and Resident Training. JAMES M. WINFIELD and STAFF.

2:00–4:00. *Genitourinary Surgery*. Operative Clinic: Plastic Correction of Hydronephrosis; Ureterosigmoidostomy
Demonstration: Selected Cases; Exhibit of Staff Training; Clinical Exhibit.

MONTEFIORE HOSPITAL

3:00–4:00. *General Surgery*. Nonoperative Clinic: Midleg Amputations in Diabetes. SAMUEL SILBERT.

MOUNT SINAI HOSPITAL

8:30–12:00. *Genitourinary Surgery*. Operative Clinic: Resection of the Rectum. Colectomy for Ulcerative Colitis. JOHN GARLOCK Nonoperative Clinic and Case Presentations. JOHN GARLOCK, LEON GINZBURG, SAMUEL KLEIN, AMEIL GLASS, GABRIEL SELEY.

2:00–5:00. *Orthopedic Surgery*. Operative and Nonoperative Clinic. ROBERT LIPPMANN, ALBERT SCHEIN, EDGAR BICK (Surgical Amphitheatre).

NEUROLOGICAL INSTITUTE

(See Presbyterian Hospital)

NEW YORK EYE AND EAR INFIRMARY

10:00–12:00. *Otolaryngology*. Demonstration: Soundproof Room and Testing. J. SWIFT HANLEY.

2:00–3:00. *Otorhinolaryngology*. Demonstration: Frontal Sinus Surgery by Motion Pictures. J. SWIFT HANLEY.

4:00–6:00. *Otorhinolaryngology*. Operative Clinic: Sinus Surgery

4:00–6:00. *Otolaryngology*. Radical Mastoidectomy. VIRGINIUS B. HIRST.

P.M.—*Ophthalmology*. Nonoperative Clinic:
Postoperative Results with Study of Operative Complications. BOYES and ASSOCIATES.
The Distribution of Newly Examined Patients and Outline for Further Studies. PAYNE and MCCLANAHAN and ASSOCIATES.
Surgical Technique with Reference to Lids and Glaucoma. MEEK and JOHNSON and ASSOCIATES.
Orthoptic Department—Muscle Anomalies.

The routine clinics of the New York Eye and Ear Infirmary will be held as usual during this period; all Fellows of the American College of Surgeons are cordially invited to attend.

NEW YORK HOSPITAL

9:00– *General Surgery.* Operative and Nonoperative Clinics. FRANK GLENN and STAFF.
Follow-up Study of Treatment of Peptic Ulcer. WILLIAM A. COOPER.
Bleeding Peptic Ulcer. CRANSTON HOLMAN.
Diagnosis of Stomach Lesions. WILLIAM A. COOPER.
Gastrojejunocolic Fistula. E. COOPER PERSON.
Carcinoma of the Head of the Pancreas. GARDNER CHILD.
Esophagogastrostomy, Follow-up of Cases. WILLIAM A. BARNES.

9:00– *Genitourinary Surgery.* Operative and Nonoperative Clinic (From the Department of Surgery, New York Hospital—James Buchanan Brady Foundation).
Perineal Prostatectomy. THOMAS J. KIRWIN.
Demonstration of Spinal Anesthesia. ROSE ANDRÉ.
Ureteropelvic Obstruction. ROY B. HENLINE.
Absorbable Gauze in Urologic Surgery. GEORGE FIEDLER.
Case Report. FRANCIS P. TWINEM.
True Adrenal Tumor of Kidney. ROBERT W. HUNT.
Uretral Obstruction in Relation to Psychosis. C. K. CHURCH.
Treatment of Bladder Tuberculosis with a New Instrument and Method. STANLEY WANG.
Glands in Female Urethra of the Infant. FRANCIS BENEVENTI.
Foreign Body in Ureter. ALBERT VERGES-PLAQUE.
Transplantation of Ureters. ALFONSO AVALOS.
Case Report. PAUL BOYD, ALBERTO GENTILE, WAYNE HANSON, CECIL HAWES.
Demonstration of Drawings of Interesting Urological Cases and Operations. WILLIAM P. DIDUSCH (Room F-956).
Motion Pictures of Urological Operations. WILLIAM P. DIDUSCH (Room F-901).

2:00– *General Surgery.* Nonoperative Clinic. FRANK GLENN and STAFF. The Resident System in Surgical Training at the New York Hospital. FRANK GLENN.
Follow-up Results—Carcinoma of Breast, Stomach, Colon, Rectum. WILLIAM A. COOPER.
Organization of Follow-up Clinic. BRONSON S. RAY.
Demonstration: FOLLOW-UP CLINIC STAFF.

2:00– *General Surgery.* Demonstration: Surgical Anatomy. Anatomy as Regards Radical Mastectomy. ERNEST W. LAMPE.

2:00– *Genitourinary Surgery.* Operative and Nonoperative Clinic:
The Treatment of Bladder Tumors (From the Department of Surgery, Cornell University Medical College, and Memorial and Bellevue Hospitals). VICTOR F. MARSHALL and STAFF.
Classification of Bladder Tumors. JOHN W. DRAPER.
Results of Radiation Therapy of Bladder Tumor. VICTOR F. MARSHALL.
Transurethral Treatment of Bladder Tumors. ALLISTER M. MCLELLAN.
Bladder Resection for Bladder Tumor. J. EDWIN DREW.
Uretero-Cutaneous Transplantation. GUSTAVUS A. HUMPHREYS.
Ureterointestinal Anastomosis. MORRIS SCHNITTMAN.
Total Cystectomy. WILLET F. WHITMORE.
Management of Advanced Carcinoma of the Bladder. ROBERT S. HOTCHKISS.
Summary and Conclusions. VICTOR F. MARSHALL.

2:00– *Otolaryngology.* Operative Clinic: Surgery of the Mastoid. GERVAIS MCAULIFFE.

NEW YORK HOSPITAL
LYING-IN HOSPITAL

A.M.– *Obstetrics and Gynecology.* Operative and Nonoperative Clinic:
Operation for Correction of Prolapse. BYRON GOFF.
Extraperitoneal Cesarean Section. CURTIS MENDELSON.
Extraperitoneal Cesarean Section (moving picture) HERVEY WILLIAMSON.

P.M.– *Obstetrics and Gynecology.* Nonoperative Clinic:
Artificial Impregnation—Late End-Results. WILLIAM H. CAREY.
Clinic for Treatment and Study of Amenorrhea. RALPH W. GAUSE.
Cardiac Disease in Pregnancy. CURTIS L. MENDELSON.
Transfusion Reactions Due to Rh Incompatibility. ELMER KRAMER.
Obstetrical Experience in Rh-negative Women. JOHN T. COLE.
End-Results of Patients with Infertility. CHARLES M. MCLANE.

NEW YORK ORTHOPEDIC DISPENSARY AND HOSPITAL

9:00– *Orthopedic Surgery.* Rounds. End-Result Conference. ALAN de FOREST SMITH.
Low Back Pain and Herniation of the Nucleus Pulposus. ALAN de FOREST SMITH.
Suppurative Arthritis. HALFORD HALLOCK.

1:30– *Orthopedic Surgery.* General Orthopedic Clinic. LEONIDAS A. LANTZOUNIS and STAFF.
Scoliosis Clinic. WILLIAM Von LOCKUM.

NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL

9:00–10:30. *General Surgery.* Nonoperative Clinic: Follow-up Results (Erdmann Auditorium).

10:30–12:00. *General Surgery.* Operative Clinic. (Amphitheatre, 6th Floor).

10:30–12:00. *Plastic and Faciomaxillary Surgery.* Nonoperative Clinic (Erdmann Auditorium):
Case Illustrations in Operative Procedures in Plastic Surgery.

2:00–5:00. *Gynecology.* Operative Clinic. (Amphitheatre, 6th Floor).

PRESBYTERIAN HOSPITAL

8:00– *General Surgery.* Operative Clinic: Thoracic Surgery. GEORGE H. HUMPHREYS, HERBERT C. MAJER, RICHMOND L. MOORE.
Thyroid Surgery. WILLIAM B. PARSONS, LAWRENCE W. SLOAN, ROBERT H. E. ELLIOTT.

8:00– *Plastic and Faciomaxillary Surgery.* Operative Clinic:
Plastic Operations. JEROME P. WEBSTER.
Release of Burn Contracture of the Neck. THOMAS W. STEVENSON.

2:00–4:00. *General Surgery.* Nonoperative Clinic: Surgical Treatment of Esophageal Neoplasm. GEORGE H. HUMPHREYS.
The Surgical Treatment of Bronchiectasis. RICHMOND L. MOORE.
Mediastinal Tumors. HERBERT C. MAIER.
Thoracoabdominal Injuries. ROBERT H. WYLIE.
Surgery of Tumors of the Ampulla of Vater and Head of Pancreas. WILLIAM B. PARSONS.
Results of Partial Gastrectomy for Peptic Ulcer. HAROLD D. HARVEY.

2:00–4:00. *General Surgery.* Nonoperative Clinic: The Long Term Follow-up in Splenectomy for Thrombocytopenic Purpura. ROBERT H. E. ELLIOTT.

Follow-up Results in Thyroid Operations. LAWRENCE W. SLOAN.

Physiological Studies in Injuries Due to Cold. OCTA C. LEIGH.

2:00–4:00. *Plastic and Faciomaxillary Surgery.* Nonoperative Clinic:

Cases of Mammaplasty with Nipple and Areola Transplantation. Plastic Repair after Excision of Carcinoma. Plastic Repair after Extensive Burns. Plastic Repair in Miscellaneous Conditions. JEROME P. WEBSTER.

Synovitis of the Wrist. Surgical Repair of X-Ray Burns. THOMAS W. STEVENSON.

PRESBYTERIAN HOSPITAL
BABIES HOSPITAL

9:00– *General Surgery.* Operative Clinic. EDWARD J. DONOVAN and STAFF.

11:00– *General Surgery.* Presentation of Current Cases.

2:00– *General Surgery.* Nonoperative Clinic:

Congenital Hypertrophic Pyloric Stenosis, Report of 600 Consecutive Cases with Follow-up. EDWARD J. DONOVAN.

Splenectomy in Children with Observations on Portocaval Anastomosis. LOUIS M. ROUSSELOT.

Duplications of the Alimentary Tract, Report of Seven Cases with Follow-up. THOMAS V. SANTULLI.

Intussusception. BRUCE M. HOGG.

PRESBYTERIAN HOSPITAL
NEUROLOGICAL INSTITUTE

9:00– *Neurosurgery.* Staff Conference. Clinical Preview of Surgical Cases to be Operated Upon Wednesday, Thursday and Friday Mornings. Guests Welcomed.

12:30–2:00. Luncheon—Bard Hall.

2:00– *Neurosurgery.* Nonoperative Clinic: Summary Presentations of Current Research Projects.

Experimental Production of Acute Disseminated Encephalomyelitis in Monkeys. ELVIN KABAT, ABNER WOLFF.

Experimental Studies of the Function of the Pyramidal System in Monkeys. FRED METTLER.

Localization of Level Lesions of the Spinal Cord by Electromyography. PAUL B. HOEFER.

Results of Treatment of Nonobstructive Hydrocephalus, Five-year Follow-up. JOHN E. SCARFF.

Premature Synostosis of the Sutures of the Cranial Vault —Treatment and Results. LESTER A. MOUNT.

Incidence of Convulsions Following Depressed Fractures of the Skull. A Follow-up Study. FRITZ CRAMER.

Surgical Procedures Directed to the Relief of Involuntary Mass Reflexes in Paraplegic Patients. J. LAWRENCE POOL.

Congenital Dermal Sinuses: Subdural Abscess; Abscess of Spinal Cord. LESTER A. MOUNT.

Anomalous Pacchionian Granulations as a Factor in Certain Types of Focal Epilepsy. Case Reports. JOHN E. SCARFF.

Therapeutic Applications of Curare Derivatives in Neurology—Motion Pictures. EDWARD B. SCHLESINGER.

4:30–5:00. Refreshments.

PRESBYTERIAN HOSPITAL
SLOANE HOSPITAL FOR WOMEN

10:00– *Obstetrics and Gynecology.* Nonoperative Clinic: Demonstration of Delivery Room Technics and Teaching. Demonstration of Operative Obstetrics if Cases Available. CHARLES STEER, ANTHONY D'ESOPO, HOWARD C. MOLOY.

2:00– *Obstetrics and Gynecology.* Nonoperative Clinic: Late Results in Cesarean Section. ANTHONY D'ESOPO.

3:00– *Obstetrics and Gynecology.* Nonoperative Clinic: Use of Stereoroentgenograms in the Diagnosis of Pelvic Types. HOWARD C. MOLOY.

4:00– *Obstetrics and Gynecology.* Nonoperative Clinic: Relation of Size of Fetal Head to Pelvic Inlet as Identified by Stereoroentgenograms. CHARLES STEER.

PRESBYTERIAN-NEW YORK ORTHOPEDIC HOSPITALS

Fracture Service

9:00–12:00. *Fractures and Traumatic Surgery.* Operative Clinic.

2:00–4:00. *Orthopedic Surgery.* Fracture Follow-up Clinic.

4:00–5:00. *Orthopedic Surgery.* X-Ray Review.

ROOSEVELT HOSPITAL

9:00– *General Surgery.* Operative Clinic: Surgical Treatment of Lesions of the Colon.

Subtotal Colectomy for Ulcerative Colitis. Rounds and Demonstration of Patients. HENRY W. CAVE and STAFF.

2:00– *General Surgery.* Nonoperative Clinic: Surgical Treatment of Lesions of the Colon.

The Management of Polyps and Papillomas of the Rectum. FREDERICK H. AMENDOLA.

Sequelae, Complications and Late Results of the Surgical Treatment of Ulcerative Colitis. (Motion Pictures of Technique of Ileostomy and Colectomy. Presentation of Cases Showing Late Results.) HENRY W. CAVE.

Pathology of Ulcerative Colitis. Gross and Microscopic Specimens (Illustrative Lantern Slides). WALTER W. BRANDES.

ST. LUKE'S HOSPITAL

8:30–11:00. *General Surgery.* Operative Clinic. WILLIAM MACFEE and STAFF.

11:00–1:00. *General Surgery.* Clinical Demonstrations: Unusual Arrest of Otherwise "Incurable Tumors." FRANCIS CARTER WOOD.

Carcinoma of Breast, Ten-year Follow-up. BENJAMIN SHORE.

Treatment of Carcinoma of Colon. WILLIAM MACFEE.

Carcinoma of Colon, Ten-year Study. EDWARD DONOVAN.

2:00–5:00. *Otolaryngology.* Operative Clinic and Clinical Demonstrations. WINSTON FOWLKES and STAFF.

ST. VINCENT'S HOSPITAL

9:00– *General Surgery.* Operative Clinic: CONSTANTINE J. MAGUIRE, CLARENCE P. HOWLEY, LOUIS SANMAN.

9:00– *General Surgery.* Operative and Nonoperative Clinic: Surgery of the Large Bowel. FRANCIS X. TIMONEY, G. E. BINKLEY, M. R. DEDDISH.

9:00– *Pathology.* Nonoperative Clinic: Report on Study of the Question of Retrolymphatic Spread in Carcinoma of the Rectum. J. F. CONNELL.

9:00– *Genitourinary Surgery.* Operative Clinics and Case Presentation. HERBERT MOHAN, THOMAS F. HOWLEY, G. MECCA.

2:00– *Plastic Surgery.* Round Table Discussion: Cleft Lip and Palate. Syndactylism. Skin Grafting of Burns. Postoperative Results and Presentation of Patients. WALTER A. COAKLEY, ROBERT H. CLIFFORD.

2:00– *Otolaryngology.* Operative Clinic and Demonstration: Oral and Laryngeal Malignancies and Non-Malignancies. JOHN M. LORE and ASSOCIATES.

Pathology. Display and Demonstration: System Diseases by Kodachrome Slides. ANTHONY ROTTINO and ASSOCIATES.

3:00– *Neurosurgery.* Surgical Treatment of Tuberculoma of the Brain Supplemented with Streptomycin. T. Q. GARVEY, JR.

Morphology of the Oligodendroglia Demonstrated by a New Method. ANTONIO GRINO.

VETERANS ADMINISTRATION HOSPITAL

9:00– *General Surgery.* Operative Clinics: DAVID K. PINKS, EDWIN SELF, JOHN E. SULLIVAN.

9:00– *Genitourinary Surgery.* Operative Clinic. LOUIS SPIVACK, PERRIN SNYDER, WILLET F. WHITMORE.

9:00– *Plastic Surgery.* Operative Clinic. HERBERT CONWAY, ROBERT H. CLIFFORD.

9:00– *Radiology.* Radiotherapy of Head and Neck. RALPH E. HERENDEEN, BERNARD ROSWIT.

9:00– *Otorhinolaryngology.* Operative Clinic. SYLVESTER DALY.

9:30–11:30. Medical Rehabilitation Clinic. HARRY KESSLER, KARL HARPUDER, IRWIN D. STEIN, BERNARD STOLL, JACOB BYER.

11:00– *General Surgery.* Nonoperative Clinic: Results of Operation for Carcinoma of the Rectum. DAVID K. PINKS.

1:30– Conference: Tumor Board. FRED STEWART, P. K. SAUER, ERNEST S. OLSON, BERNARD ROSWIT, BERNARD STRAUS, R. L. LACANNA, and RESIDENT STAFF.

3:30– *Pathology.* Conference:

Biopsies. FRED STEWART.

Sensitization of Rh-positive Patients by the Rh Factor, with Case Report. ERNEST S. OLSON.

Results of Streptomycin in Tuberculosis of the Kidney. MORRIS RAKIETEN.

Hemoglobinuric Nephrosis. ARTHUR C. ALLEN.

Carcinoma of Islands of Langerhans Treated with Alloxan. BENJAMIN S. GORDON.

EXHIBITS

Anesthesia Section
Bronchogenic Carcinoma: Review of 600 Cases
Intracranial Neoplasms
Residency Training Program
Organization of Surgical Division
Results of Vagus Resection
Pathology Section
Medical Illustrations Laboratory
Plastic Surgery
Prosthetic Appliances

WOMAN'S HOSPITAL

8:30–12:30. *Obstetrics and Gynecology.* Treatment of Neoplasms of the Female Genital Tract. Management of Birth Injuries and Uterine Displacements.

Diagnosis and Treatment of Obstetric Complications. End-Results of Treatment of These Conditions Will Be Discussed.

During the course of the morning the routine for training of Residents in Gynecology and Obstetrics will be outlined.

The pathologist will give demonstrations of obstetric and gynecologic pathological specimens.

CLINICS IN BROOKLYN—LONG ISLAND HOSPITALS

Tuesday

CUMBERLAND HOSPITAL

9:00–12:00. *Gynecology.* Operative Clinic: Gynecological Operations SAMUEL LUBIN and STAFF.

Preoperative and Postoperative Care of Gynecological Patients. CHARLES N. LOUGHRAN and STAFF.

Procidentia, Demonstration of Technique for Its Relief. HERBERT T. WIKLE.

15 Year Follow-up. Late Results in Pelvic Malignancy.

2:00–5:00. *General Surgery.* Operative Clinic: Plastic Operations on the Genitalis for Hypospadias and Espispadias. HEINRICH WEHRBEIN.

Iso-Immunization with A & B Factors in Erythroblastosis Fetalis. SILIK POLAYES.

Importance of Blood and Blood Derivatives in Obstetrics. LESLIE H. TISDALL.

Conservative Management of Abortions. RICHARD WALTMAN.

Thrombophlebitis after Pelvic Operations.

Bacillus welchii Postpartum Infection, Late Results. CHARLES LOUGHRAN.

JEWISH HOSPITAL

8:00–10:00. *General Surgery.* Operative Clinic. LOUIS BERGER and STAFF.

10:00–12:00. *General Surgery.* Nonoperative Clinic: Fascial Transplants in Repair of Large Incisional Hernia. LOUIS J. MORSE, JACOB S. BARB.

Bacillus welchii Infections of the Biliary Tract.

The Perforated Gall Bladder. BERNARD PINES.

Pitfalls in the Diagnosing and Surgical Therapy of Obstructive Jaundice. HYMAN L. BERSON, PAUL ASCHNER.

Experiences with Resection of the Vagus Nerves in the Treatment of Peptic Ulcer. THEODORE BARNETT.

Bowel Perforation with Miller Abbott Tube. SAMUEL ACHS.

Carcinoma of the Small Bowel. DAVID FARBER.

Operation for Carcinoma of the Colon Involving Adjacent Viscera. GEORGE STRENGER.

Delayed Versus Immediate Intestinal Anastomosis. LOUIS VERGER.

Surgical Indications in Chronic Ulcerative Colitis. RALPH WOLFE.

3:30– *Neurosurgery.* Nonoperative Clinic. JOSEPH H. SIRIS and STAFF.

KINGS COUNTY HOSPITAL

8:30– *Obstetrics and Gynecology.* Operative Clinics (Long Island College Service). GORDON, GLASS MCGREGOR and LIGHT.

9:30– *General Surgery.* Operative Clinic: Operation for Carcinoma of the Colon. BENJAMIN CISSEL and STAFF.

9:30– *General Surgery.* Operative Clinic: Subdiaphragmatic Vagus Neurectomy. GEORGE G. DIXON and STAFF.

2:00– *General Surgery.* Nonoperative Clinic:

End-Result of Resection of the Head of the Pancreas for Carcinoma.

End-Result of Embolectomy of the External Iliac Artery.

Follow-up on Repair of Arteriovenous Fistula.

Follow-up on Unusual Results With Internal Fixation for Fracture of Femoral Neck. BENJAMIN CISSEL and STAFF.

2:00– *General Surgery.* Nonoperative Clinic:
Report on a Series of Vagus Neurectomies.
Gastroscopy and Gastric Surgery (RICHARD SCHWARTZ by request).
Replacement Therapy by Massive Transfusions in Gastrointestinal Hemorrhage (VICTOR GINSBURG by request).

2:00– *Obstetrics and Gynecology.* Nonoperative Clinic: Topics to be Selected.

2:00– *Orthopedic Surgery.* Nonoperative Clinic:
Follow-up on Hip Bone Blocks for Painful Hips in Adults. Presentation of Cases.
Secondary Joint Changes Following Burns.
Tuberculosis of the Greater Trochanter of the Femur, Follow-up Study. Complications.
Abduction Hip Splint for Congenital Dislocation of the Hip Occipitocervicothoracic Fusion. Four-year Follow-up on an Unusual Case of Cervical Pott's Disease Complicated by Paraplegia. JOSEPH B. L'EPISCOPO and STAFF.

LONG ISLAND COLLEGE HOSPITAL

9:00– *Obstetrics and Gynecology.* Operative and Nonoperative Clinics and Demonstrations. Members of the Staff.

P.M. *Genitourinary Surgery.* Operative Clinics, Demonstrations, Cases and End-Results. FEDOR SENGER and STAFF.

METHODIST HOSPITAL

8:00–12:00. *General Surgery.* Operative Clinic. HAROLD K. BELL, SEYMOUR G. CLARK and STAFF.

8:00–12:00. *Orthopedic Surgery.* Operative Clinic. HENRY P. LANGE and STAFF.

2:00–5:00. Symposium on Gastric and Duodenal Surgery. HENRY F. GRAHAM, Moderator
The Peptic Ulcer Problem. H. K. BELL.
The Value of X-Ray in Diagnosis of Peptic Ulcer. G. W. CRAMP.
The Value of the Gastroscope in Diagnosis of Peptic Ulcer. E. A. SUNDE.
Primary Carcinoma of the Duodenum. P. A. RENAUD.
Preoperative and Postoperative Care. M. HOEFLE.
Our Experience with Subtotal Gastrectomy. S. G. CLARK.
Vagotomy for Peptic Ulcer. E. H. GRIFFIN.
Report of Unusual Cases. J. A. TIMM.
Demonstration of Pathology. J. HOWE.
Demonstration of X-Rays. G. W. CRAMP.

CLINICS IN NEW YORK HOSPITALS

Wednesday

BABIES HOSPITAL

(See Presbyterian Hospital)

BELLEVUE HOSPITAL—FIRST (COLUMBIA UNIVERSITY) SURGICAL DIVISION

8:00–12:00. *Thoracic Surgery.* Operative Clinic. FRANK B. BERRY and STAFF. (Operating Rooms C & D, 5th Floor).

BELLEVUE HOSPITAL—SECOND (CORNELL UNIVERSITY) SURGICAL DIVISION

8:30–10:30. *General Surgery.* Operative Clinics. GUILFORD S. DUDLEY and STAFF. (K-5 Operating Rooms).
Abdominoperineal Resection for Carcinoma of Rectosigmoid. GUILFORD S. DUDLEY (Operating Room A).
Split Thickness Skin Graft to Arm. CARLETON CORNELL (Operating Room B).
Subtotal Gastrectomy for Peptic Ulcer. CRANSTON HOLMAN (Operating Room C).
Thoracolumbar Sympathectomy. ERNEST W. LAMPE (Operating Room D).

10:30–1:00. *General Surgery.* Nonoperative Clinics (C & D Amphitheatre):
Report on a Series of Esophagogastrostomy Cases. LAURENCE MISCALL.
Report on 17 Cases of Richter's Hernia. DAVID LYALL, RAYMOND LUOMANEN.
Report on 120 Cases of Internal Fixation of Fractures of Neck of Femur. RAYMOND LUOMANEN, JOHN PRUDDEN.
Split Thickness Grafts in General Surgery. CARLETON CORNELL.
Report on a Series of Peptic Ulcer Perforations. S. W. MOORE, ROBERT HENDRICHS.
Report on a Series of 7 Cases of Gastrojejunocolic Fistula. HERBERT REIKERT.

2:00–5:00. *Neurosurgery.* Operative and Nonoperative Clinic (K-5 Operating Room). JOSEPH KING and WINFRID WINGEBACH; LAWRENCE POOL and HERBERT REIKERT.

2:00–4:30. *Genitourinary Surgery.* Operative and Nonoperative Clinic (K-6 Operating Room); ROBERT HOTCHKISS and HOWARD JECK; G. W. DRAPER and GEORGE SLAUGHTER; GUSTAV HUMPHREYS and JOSEPH REIKERT; DEAN MAKOWSKI.

BELLEVUE HOSPITAL—THIRD (NEW YORK UNIVERSITY) SURGICAL DIVISION

8:00–12:00. *Anesthesia.* Demonstration—Anesthesia in Thoracic Surgery. E. A. ROVENSTINE and STAFF (C & D Operating Rooms, 5th Floor, C & D Building).
Radiology. Demonstrations (I & K Building, Ground Floor). IRA I. KAPLAN and STAFF.
A New Approach to the Treatment of Gastrointestinal Malignancies by Irradiation.

9:00–4:00. *Roentgenology.* Roentgen Demonstrations of Surgical Diseases. LEWIS J. FRIEDMAN and STAFF (I & K Building, Ground Floor).
Surgical Lesions of the Small Bowel Roentgenologically Considered. J. BUCKSTEIN.
Surgical Problems of the Chest. P. STRAX.
Diagnostic Problems in Osseous Disease. M. ZURROW.
Diagnosis of Renal Surgical Disease. H. ZUKERMAN.
Interesting Neurosurgical Cases. LEWIS J. FRIEDMAN HERBERT LOBENZ.

BETH ISRAEL HOSPITAL

9:00–12:00. *Neurosurgery.* SIDNEY GROSS and STAFF.

2:00–5:00. *General Surgery.* PERCY KLINGENSTEIN and STAFF.

2:00–5:00. *Bacteriology and Serology.* Penicillin and Streptomycin. SELIGMANN.

FLOWER AND FIFTH AVENUE HOSPITALS

9:00–10:00. A New Operation for Pilonidal Cyst. JOHN HERRLIN. Preoperative and Postoperative Care. LOUIS R. KAUFMAN and WINFIELD STAFF.
10:00–12:00. Test for Viability of Bowel. JOHN HERRLIN, KURT LANGE, S. THOMAS GLASSER.
Intestinal Obstruction. ROBERT T. CROWLEY.
2:00–4:00. *Orthopedic Surgery.* ANSON H. BINGHAM.
Plastic Surgery. DAVID M. MAYER, CLARENCE R. STRAATSMA, JOHN F. FORD.
Urology. SPRAGUE CARLETON and STAFF.
Teaching Exhibit in Outpatient Department.
McGregor Orchidectomy. L. P. WERSHUB.
Fractures. Fracture Treatment—Motion Pictures and End-Results—Demonstrations. MILTON J. WILSON and STAFF.

GOLDWATER MEMORIAL HOSPITAL—THIRD SURGICAL DIVISION

9:00–11:30. *Geriatric Surgery.* Operative Clinic.
Refrigeration in Clinical Surgery. RUGGIERO.
Primary Closure in Amputations of Lower Extremity. TOBIAS.
Herniorrhaphy in the Aged, STANLEY-BROWN.
Arteriectomy. SCHNAYERSON.
Peritonitis in the Aged. CASE.
11:30–12:00. Ward Rounds.
1:00–4:30. *Geriatric Surgery.*
The Treatment of Varicose Ulcers by Ligation of Femoral Vein. KENNEDY.
Pancreatitis in the Aged. DOUBILET.
Prostactectomy in the Complicated Case. BERNSTEIN.
Interesting Urological Conditions in the Aged. SLAUGHTER.
Intravenous Procaine in Surgery. OPPENHEIM.
Arteriography. TORTORA.
Combined Lumbar Sympathectomy and Vein Ligation for Peripheral Vascular Disease. SHAFIROFF.
4:30– Forum on Surgical Investigation by Postgraduate Class of Surgery.

HARLEM EYE AND EAR HOSPITAL

8:00–9:00. *Otolaryngology.* Operative Clinic: Tonsillectomies with Meding tonsil enucleator.
9:00–10:00. *Ophthalmology and Otorhinolaryngology.* Operative Clinic: Major Eye, Ear, Nose and Throat Surgery.
10:00–11:00. *Otorhinolaryngology.* Demonstration; Demonstration of Ear, Nose and Throat Cases.
11:00–12:00. *Otorhinolaryngology.* Operative Clinic: Rhinoplastic Surgical Case.
12:00–1:00. *Otorhinolaryngology.* Operative Clinic: Lid Plastic.

HARLEM HOSPITAL

9:00–12:00. *General Surgery.* Symposium on Lymphogranuloma and Rectal Strictures. Ward Rounds. L. T. WRIGHT, J. G. LEVY, and STAFF.
2:00–5:00. *Gynecology.* Symposium. H. C. FALK, P. M. MURRAY, and STAFF.
Operative Clinic in Gynecological Surgery.
Nonoperative Clinics: (a) Management of Postabortal Infection; (b) Management of Recurrent Salpingitis; (c) Management of Pyosalpinx Complicating Fibroid with End-Results.

HOSPITAL FOR JOINT DISEASES

9:00–12:00. *Orthopedic Surgery.* Operative Clinic: Nerve Resection for Painful Arthritis of Hip Joint. ISADORE ZADEK.
Surgical Anatomy: Mechanism of Motion of Thumb. EMANUEL KAPLAN.
2:00–4:00. *Genitourinary Surgery.* Operative Clinic: Hemorrhoids. Fistulain-Ano. Benign Adenoma of Rectum. Pilonidal Cyst. Nonoperative Clinic: Lymphogranuloma Venerum. HARRY GOLDMAN.
2:00–4:00. *Genitourinary Surgery.* Operative Clinic: Surgery of the Kidneys, Ureter and Bladder. PAUL ASCHNER.
2:00–4:00. *Plastic Surgery.* Operative Clinic: Nasoplasty. Follow-up Clinic: Nasal, Lip and Face Plastics. LEOPOLD GLUSHAK.

HOSPITAL FOR SPECIAL SURGERY

8:30–12:00. *Orthopedic Surgery.* Operative Clinic. Children's Service.
9:00–12:00. *General Surgical Problems.* BEEKMAN, GRACE, COLEY, and STAFF.
2:00–5:00. General Surgical Problems and Plastic Surgery.

LYING-IN HOSPITAL

(See New York Hospital)

MANHATTAN EYE, EAR AND THROAT HOSPITAL

9:00– *Ophthalmology.* Demonstration of Aniseikonia Clinic. A. LINKSZ.
9:00– *Ophthalmology.* Operative Clinic: Plastic Operations of Eye. BYRON SMITH.
9:00– *Otolaryngology.* Demonstration: Postoperative Cases. M. F. JONES, R. J. BELLUCCI.
9:30– *Ophthalmology.* Demonstration, Glaucoma Clinic: Late Results of Glaucoma Surgery. F. L. P. KOCH.
10:00– *Ophthalmology.* Demonstration: Corneal Grafting Technique on Rabbits. H. M. KATZIN.
10:00– *Otorhinolaryngology.* Operative Clinic and Demonstration: Operation for Polypoid Sinusitis and Demonstration of Postoperative Cases. A. NIGRO.
1:30– *Otolaryngology.* Bronchoscopic Clinic: Diagnosis and Treatment. D. S. CUNNING.
2:00– *Otolaryngology.* Operative Clinic: Fenestration Operation. M. F. JONES.
2:00– *Ophthalmology and Otorhinolaryngology.* Demonstration: Allergy in Ophthalmology. Allergy in Otorhinolaryngology; Demonstration of Cases and Testing Technique. A. A. EGGSTON, A. B. PAUL.
2:00– *Otolaryngology.* Operative Clinic: Tonsil Surgery. WILLIAM H. TURNLEY.
2:00– *Ophthalmology.* Operative Clinic: Cataract Surgery. D. H. WEBSTER.
2:00– *Ophthalmology.* Demonstration: Corneal Grafting Technique: Corneal Research Laboratory. R. T. PATON, H. M. KATZIN.
3:00– *Ophthalmology.* Demonstration: Eye Pathology: Demonstration Microscopic Sections. JOSEPH LAVAL.

MEMORIAL HOSPITAL

8:00–12:00. *Tumor Surgery.* Operative Clinics.
2:00–3:00. *Tumor Surgery.* Follow-up Clinics in Cancer of the Uterus. TWOMBLY.
3:00–4:00. *Tumor Surgery.* The Conduct of End-Results in Early Cancer Detection Clinic. ELISE L'ESPERANCE.

METROPOLITAN HOSPITAL

9:00–10:00. Intestinal Obstruction. CHARLES A. HALBERSTAM, ROBERT T. CROWLEY.
10:00–12:00. *Genitourinary Surgery.* Operative Clinic: Colon Surgery. HAROLD E. CLARK.
Intestinal Intubation. WALTER L. MERSHEIMER.

2:00–4:00. *Thoracic Surgery.* Operative Clinic: Value of Cavernostomy in Tuberculosis (2 Operations) SAMUEL A. THOMPSON and STAFF.
2:00–4:00. *Neurosurgery.* Operative Clinic: Nerve Suture; Cases. THOMAS I. HOEN, IGNAZ OLJENICK and STAFF.

MONTEFIORE HOSPITAL

10:00–12:00. *General Surgery.* Nonoperative Clinic: Results of Treatment of Hydrocephalus by Choroid Plexectomy. LEO DAVIDOFF.
2:00–5:00. *General Surgery.* Operative Clinic. LEO DAVIDOFF.
3:00–5:00. *Ophthalmology.* Ophthalmological Service:
Vitreous Transplantation. S. GARTNER, B. PRIESTLEY.
Visual Field Studies in Neurosurgery. M. CHAMLIN.
Electroretinography. E. BILLET.
Modified Tarsorrhaphy for High Degrees of Exophthalmos. S. GARTNER, M. CHAMLIN.
Cataract Surgery in Young Diabetics. A. I. LANCHNER.

MOUNT SINAI HOSPITAL

8:30–10:00. *Thoracic Surgery.* Operative Clinic (Surgical Amphitheatre): Operation for Patent Ductus Arteriosus. ARTHUR S. W. TOUROFF.
10:00–12:00. *Thoracic Surgery.* Nonoperative Clinic (Surgical Amphitheatre):
Intramuscular Heparin (Concentrated) Therapy in the Prevention of Post-Operative Thrombosis and Embolism. HAROLD NEUHOF.
Technique of Operation for Clotted Hemothorax (Motion Picture Demonstration)
Results of Operative Treatment of Traumatic Thoracic Lesions in Civilian Practice. ARTHUR S. W. TOUROFF.
Operative Results in Pediatric Surgery. ERNEST E. ARNHEIM.
Results of Surgical Treatment of Perforation of the Esophagus. EDWARD A. JEMERIN.
Results of Conservative Surgical Treatment of Chronic Pulmonary Abscess. IRVING A. SAROT.
Late Results in Pulmonary Resection for Carcinoma of the Lung.
2:00–5:00. *Ophthalmology.* The Surgical Treatment of Glaucoma. JOSEPH LAVAL (Surgical Amphitheatre).
Operative and Nonoperative Clinic (Surgical Amphitheatre): Operated Cases. HENRY MINSKY, JOSEPH LAVAL, DAVID WEXLER.

NEUROLOGICAL INSTITUTE

(See Presbyterian Hospital)

NEW YORK EYE AND EAR INFIRMARY

10:00–12:00. *Otolaryngology.* Nonoperative Clinic: Fenestration—Preoperative and Follow-up. J. M. SMITH.
10:00–12:00. *Otolaryngology.* Plastic Surgery-Preoperative and Follow-up. JAY D. WHITHAM.
2:00–5:00. *Otolaryngology.* Operative Clinic: Fenestration Operation. J. M. SMITH.
2:00–5:00. *Otolaryngology.* Operative Clinic: Plastic Surgery. JAY D. WHITHAM.
P.M.– *Ophthalmology.*
Indications for Surgical Interference. KNIGHTON and ELWYN and ASSOCIATES.
The Follow-up on Plastic Surgery with Discussion of Further Steps. HUGHES and COLE and ASSOCIATES.
Surgical Demonstration with Emphasis on Cataract and Glaucoma Surgery. BERENS and ROMAINE and ASSOCIATES.
X-Rays and Localization. SCHWARTZ.

The routine clinics of the New York Eye and Ear Infirmary will be held as usual during this period; all Fellows of the American College of Surgeons are cordially invited to attend.

NEW YORK HOSPITAL

9:00– *Thoracic Surgery.* Operative and Nonoperative Clinic. FRANK GLENN and STAFF.
Surgery of Mediastinal Tumors. WILLIAM DEW. ANDRUS.
Follow-up Studies of Mediastinal Tumors. JOHN ECKEL.
Chronic Constrictive Pericarditis, Medical Aspects. HAROLD STEWART.
Chronic Constrictive Pericarditis, Surgical Aspects. WILLIAM DEW. ANDRUS.
Diagnosis of Carcinoma from Disquamated Cells. GEORGE PAPANICALAOU.
Clinical Value of Sputum Diagnosis. HENRY CROMWELL, WILLIAM A. BARNES.
2:00– *General Surgery.* Demonstration: Surgical Anatomy. Anatomy of Hand Involved in Infection and Trauma. ERNEST W. LAMPE.
2:00–4:30. *Neurosurgery.* Symposium: Conducted by BRONSON S. RAY.
Surgical Relief of Intractable Pain of the Head and Neck. HERBERT PARSONS.
Oscillographic Study of Sensory Pathways: Evidence of Bilateral Conduction. CHARLES BERRY, RICHARD KARL, JOSEPH C. HINSEY.
Alterations in Visceral Sensation After Thoracolumbar Sympathectomy. CHARLES L. NEILL.
Induced Mechanical Stresses in the Analysis of Headache Mechanisms and the Diagnosis of Intracranial Tumors. E. CHARLES KUNKLE.
Sympathetic Supply to the Lower Extremities. ARTHUR D. CONSOLE. On the Nature of Hyperalgesia. HAROLD G. WOLFF, JAMES D. HARDY, HELEN GOODELL.
Intracranial Aneurysms. BRONSON S. RAY.
2:00– *Otolaryngology.* Operative Clinic: Surgery of the Paranasal Sinuses. SAMUEL F. KELLY.

NEW YORK HOSPITAL
LYING-IN HOSPITAL

A.M.– *Obstetrics and Gynecology.* Operative Clinic:
Tubal Plastic Operation for the Relief of Sterility. J. RANDOLPH GEPFERT.
Gynecological Operations. R. GORDON DOUGLAS.
Forceps Demonstration. JAMES A. HARRAR.
P.M.– *Obstetrics and Gynecology.* Nonoperative Clinic:
Evaluation of Prophylactic Chemotherapy in Cesarean Section. R. GORDON DOUGLAS, ROBERT LANDESMAN.
Labor and Delivery Following Cesarean Section. ARTHUR WILSON.
Pregnancy Following Salpingostomy. J. RANDOLPH GEPFERT.
Studies on Pain During Labor. CARL T. JAVERT, JAMES HARDY.
The Conservative Treatment of Endometriosis. ARTHUR V. GREELEY.
The Treatment of Massive Hemorrhage. JOHN T. COLE.

NEW YORK ORTHOPEDIC DISPENSARY AND HOSPITAL

8:30– *Orthopedic Surgery.* Operative Clinic. ALAN DE FOREST SMITH and STAFF.
1:30– *Orthopedic Surgery.* General Orthopedic Clinic. HALFORD HALLOCK and STAFF.

NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL

9:00–12:00. *Neurosurgery.* Operative Clinic (Amphitheatre, 6th Floor). Follow-up Clinic (Erdmann Auditorium): Patient Illustration.

11:00–12:00. *General Surgery.* Value of Immediate and Delayed Cholangiography in the Surgical Management of Common Duct Disease. Case Illustration (Erdmann Auditorium).

12:00–1:00. *General Surgery.* Nonoperative Clinic (Erdmann Auditorium). Follow-up Results in Advanced Common Bile Duct Lesions. Case Illustration.

2:00–5:00. *General Surgery.* Operative Clinic (Amphitheatre, 6th Floor).

PRESBYTERIAN HOSPITAL

8:00– *General Surgery.* Operative Clinic: Surgery of the Breast. CUSHMAN D. HAAGENSON and STAFF.
Surgery of the Stomach. RUDOLPH N. SCHULLINGER, EDWARD L. HOWES, HAROLD D. HARVEY.

2:00–4:00. *General Surgery.* Nonoperative Clinic: Certain Essential Features Suggested by 30 Year Follow-up in Carcinoma of the Breast. HUGH AUCHINCLOSS.
The Relation of Chronic Cystic Disease to Carcinoma of the Breast. ARTHUR PURDY STOUT.
The Problem of Early Diagnosis in Carcinoma of the Breast. CUSHMAN D. HAAGENSEN.
Roentgentherapy of Carcinoma of the Breast in Nonoperated Cases and as a Preoperative and Postoperative Treatment. MAURICE LENZ.
Surgery Versus Radiation in Carcinoma of the Breast. CUSHMAN D. HAAGENSEN.

PRESBYTERIAN HOSPITAL
BABIES HOSPITAL

9:00– *General Surgery.* Operative Clinic. MEMBERS OF THE STAFF.

11:00– *General Surgery.* The Surgical Treatment of Cyanotic Heart Disease. GEORGE H. HUMPHREYS.

2:00– *General Surgery.* Nonoperative Clinic:
Roentgen Findings in Intestinal Obstruction of the Newborn. JOHN CAFFEY.
Treatment of Acute Hematogenous Osteomyelitis. Comparison of Cases Treated with and without Penicillin. Follow-up. EDWARD B. SELF.
End-Results in Operations for Undescended Testicle. EDMUND N. GOODMAN.
Inguinal Hernia in Infancy and Childhood. Indications for Operation in Infancy. Follow-up. JOSE M. FERRER

PRESBYTERIAN HOSPITAL
NEUROLOGICAL INSTITUTE

9:00–12:00. *Neurosurgery.* Operative Clinic: Cases Previously Shown Clinically at the Tuesday Morning Staff Conference.

PRESBYTERIAN HOSPITAL
THE INSTITUTE OF OPHTHALMOLOGY

9:00–12:00. *Ophthalmology.* Nonoperative Clinic: External Diseases of the Eye. JOHN HUGHES DUNNINGTON and STAFF.

2:00– *Ophthalmology.* Operative Clinic: Surgery of the Extraocular Muscles and Intraocular Operations. JOHN HUGHES DUNNINGTON.
Surgical Procedures in Glaucoma and Cataract. ALGERNON BEVERLY REESE and STAFF.

PRESBYTERIAN HOSPITAL
SECTION ON OTOLARYNGOLOGY

10:00–12:00. *Otolaryngology.* Nonoperative Clinic: Hearing Aid Fitting. MILDRED SIMMONS.
Fenestration Follow-up. FRANZ ALTMANN.
Follow-up of Cases of Bilateral Abductor Paralysis of the Larynx. DEGRAAF WOODMAN.

1:30– *Otolaryngology.* Operative Clinic: Endoscopy. GEORGE BRIGHTON.
Fenestration. DEGRAAF WOODMAN.

PRESBYTERIAN HOSPITAL
SLOANE HOSPITAL FOR WOMEN

9:00– *Obstetrics and Gynecology.* Operative Clinic: Repair of Cystocele, Rectocele and Pelvic Floor. B. P. WATSON.

10:00– *Obstetrics and Gynecology.* Operative Clinic: Operation for Vesical Incontinence. JOHN H. BOYD.

2:00– *Obstetrics and Gynecology.* Nonoperative Clinic: Surgical Problems in Sterility. C. L. BUXTON.

3:00– *Obstetrics and Gynecology.* Nonoperative Clinic: Endocrine Activation of Uterine Tumors. E. T. ENGLE.

4:00– *Obstetrics and Gynecology.* Nonoperative Clinic: The Possible Carcinogenic Effect of Estrogens. S. GUSBERG.

PRESBYTERIAN HOSPITAL
SQUIER UROLOGICAL CLINIC

9:00–12:00. *Genitourinary Surgery.* Nonoperative Clinic: Sulfonamide Mixtures in the Treatment of Genito-Urinary Disease. HARRY SENECA.
The Study of the Effect of Streptomycin on Renal Tuberculosis. Preliminary Report. JOHN K. LATTIMER.
Pathological Classifications of Adrenal Tumors. MEYER M. MELICOW.
Problems Encountered in the Diagnosis and Treatment of Congenital Anomalies of the Urinary Tract in Infants. JOHN N. ROBINSON, CHARLES T. HAZARD.

2:00–4:00. *Genitourinary Surgery.* Operative Clinic: Surgical Operations. GEORGE F. CAHILL and STAFF.

PRESBYTERIAN-NEW YORK ORTHOPEDIC HOSPITALS
Fracture Service

9:00–12:00. *Fractures and Traumatic Surgery.* Operative Clinic. CLAY RAY MURRAY and STAFF.

1:30–4:00. *Fractures and Traumatic Surgery.* Nonoperative Clinic: Shoulder Cuff Injuries and Recurrent Shoulder Dislocations with Follow-up Results. HARRISON L. MCLAUGHLIN.
Results of Open and Closed Treatment of Potts' Fractures. BARBARA B. STIMSON.

ROOSEVELT HOSPITAL

9:00– . *General Surgery.* Operative Clinic: Cancer of the Breast.
Radical Mastectomy. Rounds, Presentation of Cases and Illustration of Late Results. WILLIAM C. WHITE and STAFF.

2:00– . *General Surgery.* Nonoperative Clinic: The Late Results of Carcinoma of the Thyroid Gland. JAMES E. THOMPSON.
Presentation of Cases Illustrating Interesting and Unusual Fractures. (Illustrations.) WILLIAM H. CASSEBAUM.
Nonunion in Fractures of the Femoral Neck, Case Presentations (Illustrations). M. BECKETT HOWORTH.

ST. LUKE'S HOSPITAL

8:30–1:00. *Genitourinary Surgery.* Operative Clinic. GEORGE HOCH and STAFF.

11:00–1:00. *Orthopedic Surgery.* Clinical Demonstration: Pathological Demonstration of Internal Derangement of Knee Joint with End-Results. DAVID BOSWORTH, EDWARD WINANT.

Trochanteric Fractures of Femur. Treatment and End-Results. FRED THOMPSON.

Intracapsular Fractures of Femur. Treatment and End-Results. MATHER CLEVELAND.

2:00–5:00. *Genitourinary Surgery.* Clinical Demonstrations: Follow-up on War Paraplegics. BORIS PETROFF.

Follow-up on Renal Tumors. JOHN TAYLOR.

Follow-up on Vesical Neck Obstructions to Abdominoperineal Resection. JAMES WAUGH.

Results of Transurethral Resection. GEORGE HOCH (presented by C. H. PLACE).

Combined Treatment of Transvesical Resection and Radiotherapy of Bladder Tumors. E. CRAIG COATES.

Renal Rickets. ALLEY.

Bilateral Hydronephrosis and Hydroureter. GEORGE HOCH.

ST. VINCENT'S HOSPITAL

9:00– . *General Surgery.* Operative and Nonoperative Clinics: Surgery of Gastric and Duodenal Ulcer. GEORGE R. STUART, FRANK J. MCGOWAN, J. P. BRUCKNER.

9:00– . *General Surgery.* Operative Clinic: RAYMOND P. SULLIVAN and ASSOCIATES.

9:00– . *Neurosurgery.* Operative Clinic and Follow-up Study of the Treatment of Painful Phantom Limb by Removal of Sensory Cortex. C. G. DE GUITERREZ-MAHONEY.

2:00– . *General Surgery.* Round Table Discussion: Acute Pancreatitis. CONSTANTINE J. MAQUIRE.

Reconstruction of Common Bile Duct. RAYMOND P. SULLIVAN, JOHN C. MURPHY.

Follow-up Report on 100 Cases of Fracture of Both Bones of the Legs. EDWARD V. DENNEEN, E. R. EASTON.

2:00– . *Pathology.* Tissue Culture Demonstration of Malignancy. Display of Fresh Pathological Material. Display and Demonstration of System Diseases by Kodachrome Slides. A. ROTTINO and ASSOCIATES.

SLOANE HOSPITAL FOR WOMEN

(See Presbyterian Hospital)

VETERANS ADMINISTRATION HOSPITAL

9:00– . *General Surgery.* Operative Clinic. JOHN E. SULLIVAN, CARNES WEEKS.

9:00– . *Thoracic Surgery.* Operative Clinic. RICHMOND MOORE, WALTER CRANDALL, AARON HIMMELSTEIN.

9:00– . *Neurosurgery.* Operative Clinic. ERICH KRUEGER, FITZ CRAMER.

9:00– . *Plastic Surgery.* Operative Clinic. CLARENCE R. STRAATSMA, ROBERT CLIFFORD.

9:00– . *Otorhinolaryngology.* Operative Clinic. HENRY THALER.

9:00– . *Radiology.* Radiotherapy: Lymphomas and Leucemia. BERNARD ROSWIT.

9:30–11:30–Medical Rehabilitation Clinic—Demonstrations. HARRY KESSLER, KARL HARPUDER, IRWIN D. STEIN, BERNARD STOLL, JACOB BYER.

11:00– . *General Surgery.* Nonoperative Clinic: Carcinoma of Pancreas. J. E. SULLIVAN.

1:30– . *Thoracic Surgery.* Conference. FRANK BERRY, RICHMOND MOORE, WALTER CRANDALL, AARON HIMMELSTEIN, and RESIDENT STAFF.

3:30– . *General Surgery.* Combined Medico-Chirurgical: Differential Diagnosis of Medical and Surgical Jaundice. FRANKLIN M. HANGER, ALLEN O. WHIPPLE, FREDERIC W. BANCROFT, BERNARD STRAUS, CHARLES A. FLOOD, JOSEPH POST.

EXHIBITS

Anesthesia Section
Bronchogenic Carcinoma: Review of 600 Cases
Intracranial Neoplasms
Residency Training Program
Organization of Surgical Division
Results of Vagus Resection
Pathology Section
Medical Illustrations Laboratory
Plastic Surgery
Prosthetic Appliances

CLINICS IN BROOKLYN—LONG ISLAND HOSPITALS

Wednesday

BROOKLYN EYE AND EAR HOSPITAL

P.M. . *Ophthalmology.* Operative Clinic.

P.M. . *Ophthalmology and Otolaryngology.* Nonoperative Clinic: Late Results in Detachment of Retina. Late Results in Cataract Extraction. Late Results in Fenestration. Late Results in Dacryocystorhinostomy. Late Results in Ptosis. Motion Picture Demonstration in Color on Basic Anatomy of the Visual Pathway as Shown by Animation and Dissection.

CUMBERLAND HOSPITAL

9:00–12:30. *General Surgery.* Operative Clinic: Gastrectomy for Cancer of the Stomach with Discussion of Late Results. JOHN J. GAINEY and STAFF.

Ward Rounds with Discussion of Surgical Gall Bladder with Late Results. JOHN A. TIMM and STAFF.

Ward Rounds with Discussion of Surgery in Large Bowel Malignancy. HOWARD T. BLAIR.

Retroperitoneal Teratoma with Slides.

2:00–5:00. Arteriovenous Fistula. JOSEPH I. ANTON.

Lymphogranuloma Inguinale (Venereum) of Uterus. Follow-up. SILIK H. POLAYES.

Thoracic Surgery in General Hospital. WILLIAM H. FIELD.

Common Duct Atresia. JOHN A. TIMM.

Congenital Esophageal Atresia. SAUL F. LIVINGSTON.

Traumatic Evisceration with Follow-up. MARTIN LUTZ.

JEWISH HOSPITAL

8:00–10:00. *General Surgery.* Operative Clinic. HENRY LOURIA and STAFF, and RUDOLPH NISSEN and STAFF.

10:00–12:00. *General Surgery.* Nonoperative Clinic: Curare and Endotracheal Anesthesia in Poor Risk Patients. IRVING M. PALLIN.

Treatment of Postoperative Phlebothrombosis with Subcutaneous Heparin. EDWARD HIRSCH, LEO LOEWE.

"Bleeding Nipple." SAUL F. LIVINGSTON.

Acute Mediastinitis. LEW A. HOCHBERG.

Endorrhaphy as Surgical Procedure in the Treatment of Giant Air Cysts of the Lung. RUDOLPH NISSEN.

External Ophthalmoplegia Associated with Hyperthyroidism. VICTOR WORONOV.
The Diagnosis and Surgical Treatment of Thyroiditis. ARTHUR A. WEINBERG.
Malignant Tumors of the Thyroid Gland Diagnosis, Management and End-Results. FRANK TELLER.
Surgical Management of Goiter. HENRY W. LOURIA.
2:00– . *General Surgery*. Nonoperative Clinic: Two Unusual Cases of Sciatic Pain. S. A. BERNSTEIN.
Early Dysplasia of the Hip. Diagnosis and Treatment. M. T. KOVEN.
The Conservative Management of Slipping of the Upper Femoral Epiphysis. L. S. NELSON.
The Use of the Austin Moore Plate and Its Modifications in High Osteotomy of the Femur. B. KOVEN.
Reconstruction Key Gliding Mechanism of Upper Extremity. JOSEPH E. MILGRAM.
Composition of Bone in Relation to Blood and Diet. A. E. SOBEL.
The Application of Laminography to Some Orthopedic Problems. B. S. EPSTEIN.

KINGS COUNTY HOSPITAL

9:00–11:00. *Plastic Surgery*. Operative Clinics: Cleft Palate. Skin Graft of Burns. WALTER COAKLEY and STAFF.
9:00–11:00. *Plastic Surgery*. Nonoperative Clinic: Presentation of Cases, Ward Walk.
Acute Burns (Lye, Acid, Hot Water, Electricity and Fire).
Hump and Saddle Noses.
Cleft Lip and Palate.
Contracted Scars.
Web Fingers.
Hemangioma and Lymphangioma of Lip.
Jug-handle Ears.
Depressed Fractures—(a) of Malar Bone; (b) of Zygomatic Processes; (c) of Infraorbita Ridge; (d) Fractures of Mandible with and without Loss of Substance; (e) Fractures of Superior Maxilla.
Skin Grafts—(a) Split-skin, (b) Tube Grafts.
Exhibition of Moulages, Photographs and X-rays of Facial Bone Fractures.
Animated Motion Pictures: Reconstructive Surgery of the Bones of the Face. Cleft Palate Operation.
2:00– . *Plastic Surgery*. Presentations. WALTER COAKLEY.
Experiences in the Treatment of 1500 Severe Burns. WALTER COAKLEY.
Results of Skin-Grafting in Chronic Leg Ulcers. DAVID TEPLITSKY.
Skin-Grafting of Burns. JOSEPH CALTAGIRONE.
Rhinoplastic Procedures.

LONG ISLAND COLLEGE HOSPITAL

10:00– . *General Surgery*. Operative Clinics: Thyroidectomy and Other Procedures. EMIL GOETSCH and STAFF.
Chronic Thyroiditis. EMIL GOETSCH.
Rôle of Thiouracil and Its Derivatives in the Preparation of the Critically Ill Hyperthyroid Patient. ARTHUR GOETSCH.
The Pressure Case as a Problem in Thyroid Surgery. ALBERT J. RITZMANN.
Surgical Treatment of Colon Carcinoma. BENJAMIN CISSEL.
Radical Mastectomy for Breast Malignancy; Rodman's Method. GAETANO DEYOANNA.
Spontaneous Rupture of Bile Ducts Following Cholecystectomy.
Postoperative Management of Thoracic Surgery Patients. E. K. JOHNSON.
Exteriorization of Ileocecal Region for Obstructing Lesions in Infants and Children. ROBERT MAINZER.
(The Departments of Ophthalmology and Otolaryngology will conduct their programs at the Brooklyn Eye and Ear Hospital.)

METHODIST HOSPITAL

8:00–12:00. *General Surgery*. Operative Clinic. PIERRE A. RENAUD, JOHN A. TIMM and STAFF.
Genitourinary Surgery. Operative Clinic. HOWARD T. LANGWORTHY and STAFF.
2:00–5:00. Symposium on General Surgery and Specialties. ARTHUR H. BOGART, Moderator.
Surgery of the Gastrointestinal Tract in the Newborn. C. D. SAWYER.
The Meynen Operation for Inguinal Hernia. E. MARTINSON.
Hyperpyrexia in Surgery. A. VOSSELER.
Management of Acute Cholecystitis. H. F. GRAHAM.
Acute Pancreatitis—A Ten Year Survey. M. CARMFR.
Supracondylar Fractures of Humerus. H. P. LANGE.
Follow-up on Unusual Genitourinary Cases. H. T. LANGWORTHY.
Tuberculosis in Polycystic Kidney. R. MULE.
Care of Genitourinary Tract in Paraplegics. O. P. SCHOENEMANN.
Thoracoabdominal Injuries. E. MARTINSON.
Demonstration of Pathology. J. HOWE.
Demonstration of X-rays. G. W. CRAMP.

ST. JOHN'S HOSPITAL

8:00–10:00. *General Surgery*. Operative Clinic: Thyroidectomy for Toxic Diffuse Goiter. Patient Prepared with Propylthiouracil. Subtotal Gastric Resection for Duodenal Ulcer.
8:00–10:00. *Gynecology*. Operative Clinic: Manchester-Fothergill Operation. Vaginal Hysterectomy.
10:00–12:00. Nonoperative Clinic:
Demonstration of Unusual X-ray Findings and Problems in Diagnosis—Informal Discussion.
Demonstration of Unusual Gross Pathological Specimens—Informal Discussion.
Ward Rounds—Gynecology.
Ward Rounds—General Surgery Including, Thoracic Surgery, Surgery of the Hand, Gastrointestinal Surgery, Orthopedic Surgery.
(Luncheon in the Main Dining Room as Guests of the Hospital.)
1:30–4:30. Round Table Discussion:
The Present Status of Propylthiouracil in Toxic Goiter. MERRILL N. FOOTE.
Open Surgical Resection for Carcinoma of the Dome of the Bladder as a Treatment of Choice—End-Results. A. HARRIS.
The Clinical Application of Cardiopulmonary Physiology in Thoracic Surgery. ELGIE JOHNSON.
Evaluation of Therapeutic and Diagnostic Paravertebral Block in Vascular Diseases of the Extremities. LEONID WATTER.
Surgical Lesions of the Hand, Follow-up Results. GEORGE B. REITZ.
(a) Postpartum Eclampsia Associated with Hydatidiform Mole—End-Results; (b) Geriatric Gynecological Surgery—End-Results. CHARLES MUELLER.
Shoulder Pain—Diagnosis and Operative Treatment. ROBERT WARREN, ARTHUR MICHELE.
The Value of Detergent (Areusol O.T.) in Antibiotic Therapy. E. J. GRACE.

CLINICS IN NEW YORK HOSPITALS

Thursday

BABIES HOSPITAL

(See Presbyterian Hospital)

BELLEVUE HOSPITAL—FIRST (COLUMBIA UNIVERSITY) SURGICAL DIVISION

8:00–12:00. *Thoracic Surgery.* Operative Clinic. (Operating Rooms C and D, 5 th floor). FRANK B. BERRY and STAFF.

2:00–4:30. *Thoracic Surgery.* Nonoperative Clinic. (I & K Building, Stewart Amphitheatre). FRANK B. BERRY and STAFF.

Suppurative Diseases of the Lung. WALTER B. CRANDELL.

Cardiopulmonary Physiology. RICHARD RILEY, AARON HIMMELSTEIN.

Surgery of Tuberculosis. JOHN MAXWELL CHAMBERLAIN.

Surgical Treatment of Chronic Spontaneous Pneumothorax. HERBERT C. MAIER.

Carcinoma of the Lung. ADRIAN LAMBERT.

BELLEVUE HOSPITAL—THIRD (NEW YORK UNIVERSITY) SURGICAL DIVISION

8:00–10:00. *General Surgery.* Operative Clinics (Operating Rooms K-5 and K-6; Psychiatric Surgical Operating Room). JOHN H. MULHOLLAND and STAFF.

Thyroidectomy. JOHN A. LAWLER (Operating Room A).

Anterior Resection of the Rectum for Carcinoma. SAMUEL STANDARD (Operating Room B).

Section of Sphincter of Oddi for Pancreatitis. JOHN MULHOLLAND, HENRY DOUBILET (Operating Room C).

Lumbar Sympathectomy for Peripheral Vascular Disease. WALLACE B. MURPHY (Operating Room D).

Murray-Brackett Osteotomy for Unlimited Fracture of Neck of Femur. IRWIN S. SIRIS (Bone Room K-6).

Bone Graft for Ununited Fracture of Tibia. IRWIN S. SIRIS (Bone Room K-6).

Thoracolumbar Sympathectomy for Hypertension. HIPPOLYTE M. WERTHEIM (Psychiatric-Surgical Operating Room 7).

10:30–1:00. *General Surgery.* Nonoperative Clinics (I & K Building, Stewart Amphitheatre).

Results of Section of Sphincter of Oddi for Pancreatitis. HENRY DOUBILET.

Rôle of Sulfadiazine in Thyrotoxic Patients. JOHN A. LAWLER.

Results and Follow-up in Carcinoma of the Rectum Treated with Anterior Resection. SAMUEL STANDARD.

Pulmonary Complications in Surgery. WALTER CRANDELL.

Fluid Compartments in Depleted Surgical Patients and Changes During Repletion. CO TUI.

General Principles of Reconstructive Plastic Surgery of the Face. JOHN M. CONVERSE.

Program of Postgraduate Training in Surgery at New York University College of Medicine. JOHN H. MULHOLLAND.

A.M. *Radiology*—Demonstrations (I & K Building, Ground Floor). Treatment of Carcinoma of the Cervix. IRA I. KAPLAN and STAFF.

8:00–12:00. *Anesthesia.* Demonstration (C & D Operating Rooms, 5th Floor, C & D Building). Anesthesia in Thoracic Surgery. E. A. ROVENSTINE and STAFF.

8:30–12:00. *Gynecology.* Operative Clinic. WILLIAM E. STUDDIFORD and STAFF (K-6 Operating Room).

Total Hysterectomy for Fibroid. CLAUDE E. HEATON.

Unusual Cases of Dysmenorrhea in Young Women—A Report of 2 Cases (paper).

Fascial Transplant for Relief of Stress Incontinence in Patients with Previous Operations. WILLIAM E. STUDDIFORD.

9:00–4:00. *Roentgenology.* Roentgen Demonstrations of Surgical Diseases. LEWIS J. FRIEDMAN and STAFF (I & K Building, Ground Floor).

Surgical Lesions of the Small Bowel Roentgenologically Considered. J. BUCKSTEIN.

Surgical Problems of the Chest. P. STRAX.

Diagnostic Problems in Osseous Disease. M. ZURROW.

Diagnosis of Renal Surgical Disease. H. ZUKERMAN.

Interesting Neurosurgical Cases. LEWIS J. FRIEDMAN, HERBERT LOBENZ.

2:00–5:00. *Otorhinolaryngology.* Operative Clinic (K-6 Operating Room) Laryngeal Surgery. JOHN F. DALY and STAFF.

2:00–5:00. *Anesthesia.* Demonstrations (K-6 Operating Rooms). Therapeutic Nerve Block Clinic. Anesthesia and Shock. E. A. ROVENTSINE and STAFF.

BETH ISRAEL HOSPITAL

9:00–12:00. *Gynecology.* Operative and Nonoperative Clinic. HENRY FALK and STAFF.

2:00–5:00. *Anesthesia.* Clinical Demonstrations—Film on Hemorrhage and Shock. S. G. HERSHEY and STAFF.

FLOWER AND FIFTH AVENUE HOSPITALS

9:00–11:00. *Neurosurgery.* Lumbar Sympathectomy—Technique of Block. S. THOMAS GLASSER, DONALD E. BRACE.

11:00–12:00. Hand Infections. JAMES M. WINFIELD, JOHN HERRLIN.

General Surgery. Diseases of Vascular System. FREDERIC W. BANCROFT.

2:00–3:00. Exhibit of Postgraduate School—Regional Ileitis. JOSEPH H. FOBES.

3:00–5:00. Functional Concept of the Internal Ring—Surgical Application in the Repair of Inguinal Hernia—Operating Room or Cadaver. J. CLIFFORD HAYNER.

HARLEM HOSPITAL

9:00–12:00. *Trauma Symposium.* Ward Rounds. L. T. WRIGHT.

Head and Neck Injuries. D. H. SMITH, J. GREENE, S. SHENKMAN.

Fractures of the Extremities with Late Results. A. C. LOGAN, W. A. FREEMAN, A. PRIVITERA, C. DI LORENZO.

2:00–5:00. *Obstetrical Symposium.* Obstetrical Emergencies; Toxemia of Pregnancy. F. A. KASSEBOHM, A. C. POSNER, J. KURZROCK, M. SCHREIBER, N. PLESCHETTE.

HOSPITAL FOR JOINT DISEASES

9:00–12:00. *Orthopedic Surgery.* Operative Clinic. HARRY SONNENSCHEIN and STAFF.

Transcervical Osteotomy for Slipped Femoral Epiphysis. A. KENIN.

Femoral Shortening for Inequality of Leg Length. B. J. MINTZ.

Nonoperative Clinic: Transcervical Osteotomy. A. KENIN.

Equalization of Leg Length. B. J. MINTZ.

Tendon Transplantation for Radial Nerve Paralysis. H. ALTMAN.

Curvilinear Osteotomy. C. SORELL.

2:00–4:00. *Orthopedic Surgery.* Demonstration: X-Rays of Primary Bone Tumors. MAURICE POMERANZ.

2:00–4:00. *Ophthalmology.* Operative Clinic: Operations on the Eye. JAMES W. SMITH.

HOSPITAL FOR SPECIAL SURGERY

8:30–12:00. *General Surgery.* Operative Clinic.

9:00–12:00. *Orthopedic Surgery.* Adult Orthopedic Problems.

2:00–5:00. *Orthopedic Surgery.* Operative and Nonoperative Clinic: Hip Problems.

Treatment of Fractures of Femoral Neck in the Aged. FREDERICK von SAAL.

Trochanteric Arthroplasty. PHILIP D. WILSON.

Transplantation of External Oblique for Paralysis of Hip Abductors. LOWELL THOMAS, T. CAMPBELL THOMPSON, L. RAMSAY STRAUB.

Treatment of Congenital Dislocation of the Hip with Anteversion. FRANCIS CARR.

Idiopathic Aseptic Necrosis of the Hip in Adults. WILLIAM COOPER.

LYING-IN HOSPITAL

(See New York Hospital)

MANHATTAN EYE, EAR AND THROAT HOSPITAL

9:00– . *Ophthalmology.* Operative Clinic: Cataract Extraction; Corneal Transplant; Dacryocystorhinostomy. G. BONACCOLTO.

10:00– . *Ophthalmology.* Laboratory Demonstration: Bacteriology of the Eye. F. C. KEIL, JR.

10:00– . *Otolaryngology.* Demonstration: Results in Cases of Arytenoidectomy. J. D. KELLY.

10:00– . *Ophthalmology and Otorhinolaryngology.* Plastic Surgery Clinic: Conference on End-Results; Lantern Slides and Motion Pictures. J. M. CONVERSE, BYRON SMITH.

1:00– . *Ophthalmology and Otorhinolaryngology.* Operative Clinic: Plastic Surgery. BYRON SMITH, J. M. CONVERSE.

2:00– . *Ophthalmology.* Operative Clinic: Corneal Graft. R. T. PATON.

2:00– . *Ophthalmology.* Demonstration: Vitreous Substitution; Technique and End-Results. MILO FRITZ.

2:00– . *Ophthalmology and Otolaryngology.* Radiology Clinic: Radiation Therapy in Ophthalmology. Results of Radiation in Laryngeal Tumors. MAURICE LENZ, J. R. FREID, C. OKRAINETZ.

2:00– . *Otorhinolaryngology.* Demonstration: Radiation of Hypertrophied Lymphoid Tissue of Nasopharynx. H. D. TATERKA.

2:00– . *Otolaryngology.* Operative Clinic: Arytenoidectomy Operation. J. D. KELLY.

3:00– . *Ophthalmology.* Demonstration: Postoperative Corneal Graft Cases. R. T. PATON.

MEMORIAL HOSPITAL

9:00–12:00. *Tumor Surgery.* Discussion: Five Year Survivals in Lymphomas and Leucemias. LLOYD F. CRAVER.

The Use of Newer Nitrogen Mustard Compounds in the Treatment of Lymphomas and Leucemias. JOSEPH BURCHENAL.

Nitrogen Mustard As a Palliative Agent in Cancer. DAVID KARNOFSKY.

The Rôle of Radioactive Iodine in Thyroid Cancer. JACK TRUNELL.

Reasons for Delay in the Diagnosis of Cancer. JOHN E. LEACH, GUY ROBBINS.

Preoperative and Postoperative Care for Cancer of the Lung. JOHN E. LEACH, HENRY DIAMOND.

Study of Diagnostic Methods and Treatment of Cancer of the Lung. JOHN S. LADUE.

The Internist's Rôle in Cancer. WILLIAM H. LEWIS, JR.

Metabolic Changes in Cancer. JULES C. ABELS.

Treatment of Shock. HENRY TAGNON.

2:00–3:30. *Tumor Surgery.* Nonoperative Clinic: Follow-up Results in Different Types of Breast Cancer.

3:30–5:00. *Tumor Surgery.* Follow-up Results in Patients with Metastatic Carcinoma of the Breast with Endocrine Therapy.

METROPOLITAN HOSPITAL

9:00–12:00. *General Surgery.* Preoperative and Postoperative Treatment. JAMES M. WINFIELD and STAFF, and LOUIS R. KAUFMAN, JOHN HERRLIN, EDWARD J. MCCABE.

General Discussion.

Fluid Balance. JOHN HERRLIN.

Early Ambulation and Early Exercise. EDWARD J. MCCABE.

2:00–4:00. *Obstetrics and Gynecology.*

Interesting Ovarian Tumors. W. B. SILBERBLATT.

Ectopic Pregnancy with Especial Reference to Posterior Colkotomy. JOHN E. TRITSCH.

Orthopedic and Fracture Clinic, 80th Street Dispensary. Demonstration of End-Results of Injuries to Lower Extremities. MILTON J. WILSON and STAFF.

MONTEFIORE HOSPITAL

2:00–5:00. *Thoracic Surgery.* Operative and Nonoperative Clinic. ARTHUR H. AUFSES, ISIDOR KROSS.

MOUNT SINAI HOSPITAL

8:30–12:00. *General Surgery.* Operative Clinic: Subtotal Gastrectomy and Infradiaphragmatic Vagotomy for Duodenal Ulcer with Stenosis. RALPH COLP.

Presentations: Physiologic Differences between Gastric and Duodenal Ulcers. FRANK HOLLANDER.

A Rational Approach to the Surgery of Juxta-Esophageal Ulcer. LEONARD DRUCKERMAN.

Problems in the Treatment of Gastrojejunocolic Fistula. PERCY KLINGENSTEIN.

Follow-up Results in Subtotal Gastrectomy for Gastric and Duodenal Ulcer. SIGMUND MAGE.

Indications for Vagotomy in Peptic Ulcer. RALPH COLP.

2:00–5:00. *Otorhinolaryngology.* Operative and Nonoperative Clinic: Inflammatory and Neoplastic Diseases of the Frontal Sinuses.

Carcinoma of the Larynx and Results, Treatment by Radiation Therapy. RUDOLPH KRAMER, MORRIS BENDER, IRVING GOLDMAN, JOSEPH DRUSS, SAMUEL ROSEN and STAFF (Surgical Amphitheatre).

NEUROLOGICAL INSTITUTE

(See Presbyterian Hospital)

NEW YORK EYE AND EAR INFIRMARY

10:00–12:00. *Otolaryngology.* Demonstration and Discussion: X-Ray Techniques Used in Otolaryngology. IRVING SCHWARTZ.

2:00–3:00. *Ophthalmology and Otorhinolaryngology.* Discussion: Allergy in Eye, Ear, Nose and Throat. HOWARD WESTCOTT.

2:00–4:00. *Otorhinolaryngology.* Demonstration: Equipment Including the Biplanor Fluoroscope in the Bronchoscopic Clinic. MAXWELL D. RYAN.

3:30–4:30. *Otorhinolaryngology.* Demonstration: Methods —Allergy.

P.M.– *Ophthalmology.* Demonstration: Postoperative Treatment. MEEK and JOHNSON and ASSOCIATES.

Diagnostic Studies with Special Reference to Muscle Studies. BOYES and ASSOCIATES.

Surgery with Special Reference to Lacrimal Apparatus. PAYNE and MCCLANAHAN and ASSOCIATES.

Routine clinics of the New York Eye and Ear Infirmary will be held as usual during this period; all Fellows of the American College of Surgeons are cordially invited to attend.

NEW YORK HOSPITAL

9:00– . *Plastic and Faciomaxillary Surgery.* Operative and Nonoperative Clinic: One Stage Push Back Operation for Congenitally Short Palate.

Results Following Treatment of Carcinoma of the Head and Neck. Case Presentations. HERBERT CONWAY.

Speech Therapy in Cases of Cleft Palate. E. FREUD.

End-Results Following Radical Breast Amputation With Split Skin Grafting. CHARLES NEWMAN.

Adult Tissue Extract in Wound Healing. JAMES DINGWALL.

9:00– . *Ophthalmology.* Operative Clinic: Intracapsular Cataract; Glaucoma; Strabismus. JOHN MCLEAN and STAFF.

2:00 . *General Surgery.* Operative and Nonoperative Clinic. FRANK GLENN and STAFF.

Surgical Treatment of Acute Cholecystitis. FRANK GLENN.

Pathology of Acute Cholecystitis. N. C. FOOTE.

Complications of Acute Cholecystitis. S. W. MOORE.

Diverticulitis of Large Bowel, Follow-up Studies. GARDNER CHILD.

Follow-up Studies of Polyps of the Large Intestine. S. W. MOORE.

Demonstration and Exhibit. Surgical Pathological Laboratory. N. C. FOOTE.

2:00– . *General Surgery.* Demonstration: Surgical Anatomy. Anatomy Involved in Lumbar and Thoracolumbar Sympathectomy. ERNEST LAMPE.

2:00 . *Otorhinolaryngology.* Nonoperative Clinic: Case Presentations and Postoperative Result. Laryngofissure, Carcinoma of Antrum. Mastoiditis with Petrositis and Meningitis. Acute Frontal Sinusitis with Meningitis. ARTHUR PALMER and ASSOCIATES

NEW YORK HOSPITAL
LYING-IN HOSPITAL

A.M.– *Gynecology.* Operative Clinic: Gynecological Operations. H. J. STANDER.

P.M.– *Obstetrics and Gynecology.* Nonoperative Clinic:

Late Results in Patients with Recurrent Abortion. CARL T. JAVERT.

Eclampsia. H. J. STANDER.

Treatment of Endocervicitis. RALPH W. GAUSE.

X-Ray Pelvimetry. CHARLES M. MCLANE.

Missed Abortion. FRANK SMITH.

NEW YORK ORTHOPEDIC DISPENSARY AND HOSPITAL

9:00– . *Orthopedic Surgery.* Rounds. End-Result Conference. ALAN DE FOREST SMITH.

Osteoarthritis of the Hip. FRANK STINCHFIELD.

Slipping of the Upper Femoral Epiphysis. M. B. HOWARTH.

1:30– . *Orthopedic Surgery.* General Orthopedic Clinic. LEONIDAS A. LANTZOUNIS and STAFF.

Scoliosis Clinic. WILLIAM VON LOCKUM.

NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL

9:00–12:00. *Tumor Surgery.* Operative and Nonoperative Clinic (Amphitheatre, 6th Floor and Erdmann Auditorium): Problems in Surgery of Tumors of Breast, Head and Neck.

2:00–5:00. *Traumatic Surgery.* Operative and Nonoperative Clinic (Amphitheatre, 6th Floor and Erdmann Auditorium).

PRESBYTERIAN HOSPITAL

8:00– . *General Surgery.* Operative Clinic: Surgery of the Pancreas. JOHN S. LOCKWOOD, WILLIAM B. PARSONS.

Surgery of the Spleen. LOUIS M. ROUSSELOT, ROBERT H. E. ELLIOTT.

Portacaval Anastomosis. ARTHUR H. BLAKEMORE.

Resection of Maxilla For Carcinoma. MAURICE J. HICKEY.

2:00–4:00. *General Surgery.* Nonoperative Clinic: Tissue Culture as an Adjunct to Surgery. MARGARET MURRAY.

Phlebograms of the Lower Extremity. DAVID C. BULL.

Oxidized Cellulose in Surgery. VIRGINIA K. FRANTZ.

Transfusions and the Rh Factor. JOHN SCUDDER.

Indications for Portacaval Shunt. ARTHUR H. BLAKEMORE.

PRESBYTERIAN HOSPITAL
BABIES HOSPITAL

9:00– . *General Surgery.* Operative Clinic. Ward Rounds. Members of Staff.

2:00– . *General Surgery.* Nonoperative Clinic:

Congenital Diaphragmatic Hernia. Follow-up. EDWARD J. DONOVAN.

An Analysis of the Neoplasms in Childhood Encountered at Babies Hospital in the Past Ten Years. DOROTHY H. ANDERSEN.

Meconium Ileus. Presentation of Cases. Motion Pictures Illustrating Pathology and Operative Procedure. ROBERT B. HIATT.

Acute Appendicitis in Children. A Comparison of the Last Two Five-year Periods with and without Chemotherapy. EARL C. TAYLOR.

PRESBYTERIAN HOSPITAL
NEUROLOGICAL INSTITUTE

9:00–12:00. *Neurosurgery.* Operative Clinic: Cases Previously Shown Clinically at the Tuesday Morning Staff Conference.

PRESBYTERIAN HOSPITAL
SLOANE HOSPITAL FOR WOMEN

9:00– . *Obstetrics and Gynecology.* Operative Clinic: Total Hysterectomy. E. COLER.

10:30– . *Obstetrics and Gynecology.* Operative Clinic: Myomectomy. HOWARD C. TAYLOR, JR.

2:00– . *Obstetrics and Gynecology.* Radiology. Implantation of Radium for Carcinoma of the Cervix. JAMES CORSCADEN, S. GUSBERG.

3:00– . *Obstetrics and Gynecology.* Nonoperative Clinic: Late Follow-up Results in Carcinoma of the Cervix. JAMES CORSCADEN.

PRESBYTERIAN-NEW YORK ORTHOPEDIC HOSPITALS

Fracture Service

9:00–12:00. *Fractures and Traumatic Surgery.* Operative Clinic.

1:30–4:00. *Fractures and Traumatic Surgery.* Nonoperative Clinic: Complicated Elbow Fractures with Follow-up Results. FREDERICK M. SMITH.

Replacement of Articular Elements. STEPHAN S. HUDACK.

ROOSEVELT HOSPITAL

9:00– . *Gynecology.* Operative Clinic. THOMAS C. PEIGHTAL, ARTHUR V. GREELY and STAFF.

11:00– . *Gynecology.* Nonoperative Clinic: The Early Results of Malignancies of the Female Pelvic Organs; Prolapse of the Uterus, etc.

2:00– . *Genitourinary.* Operative Clinic: Suprapubic Prostatectomy. SIMON A. BEISLER and STAFF.

Nonoperative Clinic: The Presentation of Patients, Illustrating the Results of Urological Procedures. Total Cystectomy With Skin and Sigmoidal Implantation.

The Reimplantation of Skin Ureterostomies Into the Bowel.

ST. LUKE'S HOSPITAL

8:30–11:00. *General Surgery.* Operative Clinic. WILLIAM MACFEE and STAFF.

11:00–1:00. *General Surgery.* Clinical Demonstrations: Benign Intrathoracic Tumors. ALEXANDER ADA.

Follow-up Results of Surgery of Gall Bladder and Bile Ducts. Ten-year Study. EDWARD DONOVAN

Trends in Curare—Technique Anesthesia. EDWARD BURFORD and STAFF.

Management of Hemorrhage for Gastric and Duodenal Ulcers. ROBERT FRASER.

2:00–4:00. *Ophthalmology.* Operative Clinic. GUERNSEY FREY and STAFF.

4:00–5:00. *Ophthalmology.* Clinical Demonstrations: Glaucoma. Results of Operation. GUERNSEY FREY.

Extraocular Muscle Surgery. Follow-up Results. HENRY SMITH.

ST. VINCENT'S HOSPITAL

9:00– *Gynecology and Obstetrics.* Operative Clinic: Vaginal Plastics. Abdominal Hysterectomy. Vaginal Hysterectomy. Cesarean Section. JOHN MCGRATH, JAMES P. HENNESSY, THOMAS E. LAVELL, JOSEPH E. CORR, THOMAS IOVINO, ROBERT LOWRIE, JOHN KILGUS, WALTER P. GAGE.

10:00– . *General Surgery.* Round Table Conference: Use of Transverse Incisions. JOHN A. LAWLER.

Malignant Tumors Small Intestine. CLARENCE P. HOWLEY.

10:00– . *Radiology.* Roentgen Diagnosis of Lesions of Small Intestines. Differential Diagnosis of Mechanical and Adynamic Ileus. WALLACE MAYER and ASSOCIATES.

2:00– . *Gynecology and Obstetrics.* Round Table Conference:

Study of Vaginal Spread for Carcinoma of Cervix. Differential Diagnosis in Cases of Acute Pelvic Pathology. Indications for Cesarean Section. Choice of Operation in Uterine Prolapse. MCGRATH and ASSOCIATES.

2:30– . *Pathology.* Nonoperative Clinic: Study of Abdominal and Chest Fluids for Evidence of Malignancy. Display of First Pathological Material. Display and Demonstration of System Diseases by Kodachrome Slides. A. ROTTINO and ASSOCIATES.

3:00– . *General Surgery.* Thrombosis and Embolism. LOUIS F. SANMAN.

SLOANE HOSPITAL FOR WOMEN

(See Presbyterian Hospital)

VETERANS ADMINISTRATION HOSPITAL

9:00– . *General Surgery.* Operative Clinic: EDWIN SELF, DAVID K. PINKS.

9:00– . *Neurosurgery.* Operative Clinic: Prefrontal Lobotomy. JOHN E. SCARFF, ERICH KRUEGER.

9:00– . *Genitourinary Surgery.* Operative Clinic. LOUIS SPIVACK, EDWIN J. DREW.

9:00– . *Plastic Surgery.* Operative Clinic. HERBERT CONWAY, CORNELIUS J. KRAISSL.

9:00– . *Orthopedic Surgery.* Conference: Presentation of End-Results—Bone Tumors; Bone and Joint Tuberculosis. Presentation of Cases. PHILIP D. WILSON, SYDNEY N. EICHENHOLTZ, ROBERT PATTERSON, FRANK E. STINCHFIELD, and RESIDENT STAFF.

9:30–11:30. Medical Rehabilitation Clinic. HARRY KESSLER, KARL HARPUDER, IRWIN D. STEIN, BERNARD STOLL, JACOB BYER.

11:00– . *General Surgery.* Nonoperative Clinic: Result of Vagus Resection. P. K. SAUER, JOHN ECKEL, CRANSTON HOLMAN, FRANK J. MCGOWAN, CHARLES PRIVITERI, and RESIDENT STAFF.

11:00– . *Neurosurgery.* Nonoperative Clinic: Prefrontal Lobotomy. JOHN E. SCARFF, THOMAS RENNIE, HILAND L. FLOWERS.

1:30– . *Neurosurgery.* Conference: Complications in Frontal Cranioplasties Involving Frontal Sinus. Surgery of the Sympathetic Nervous System for Painful Conditions. Leptomeningeal and Porencephalic Cyst with Increased Intracranial Pressure. Surgical Treatment of Phantom Limb. Compression of the Anterior Pyramidal Tract by Cervical Midline Disc. Luetic Pachymeningitis with Increased Intracranial Pressure. JOHN E. SCARFF, FRITZ CRAMER, E. G. KRUEGER, J. LAWRENCE POOL.

3:30– . *Urology.* Conference. ARCHIE DEAN, LOUIS SPIVACK, PERRIN SNYDER, EDWIN J. DREW, WILLET WHITMORE, JOHN K. LATTIMER, and RESIDENT STAFF.

EXHIBITS

Anesthesia Section
Bronchogenic Carcinoma: Review of 600 Cases
Intracranial Neoplasms
Residency Training Program
Organization of Surgical Division
Results of Vagus Resection
Pathology Section
Medical Illustrations Laboratory
Plastic Surgery
Prosthetic Appliances

WOMAN'S HOSPITAL

8:30–12:30. *Obstetrics and Gynecology.* Treatment of Neoplasms of the Female Genital Tract. Management of Birth Injuries and Uterine Displacements. Diagnosis and Treatment of Obstetric Complications. End-Results of Treatment of These Conditions Will Be Discussed.

During the course of the morning the routine for training of Residents in Gynecology and Obstetrics will be outlined.

The pathologist will give demonstrations of obstetric and gynecologic pathological specimens.

CLINICS IN BROOKLYN—LONG ISLAND HOSPITALS

Thursday

BROOKLYN EYE AND EAR HOSPITAL

P.M. *Ophthalmology, Otolaryngology and Faciomaxillary Surgery.* Late Results in Faciomaxillary Surgery. Late Results in Laryngectomies. Late Results in Glaucoma Surgery. Angioscotometry Exhibit. Motion Picture Demonstration on the Development of the Human Eye as Shown by Animation.

P.M. *Plastic Surgery.* Operative Clinic: Nasal.

CUMBERLAND HOSPITAL

9:00–12:00. *Fractures and Traumatic Surgery.* Pinning for Femur Neck Fracture. LEO FASKE and STAFF.
Late Results in Fracture of Femur Neck.
Traumatic Abdomen. JOSEPH I. ANTON.
Ward Rounds with X-ray Studies of Various Types of Fractures.

2:00–5:00. *Fractures and Traumatic Surgery.* Nonunion, Late Results and General Discussion. JOSEPH NEVINS and STAFF.
Ward Rounds with Demonstration of Apparatus in Use. Gadgets and Their Use in Fracture Treatment.
Head Injuries. Late Results. FRANK TURNEY.

HOUSE OF ST. GILES THE CRIPPLE

11:00– . *Orthopedic Surgery.* Abduction Traction Splint for Congenital Dislocation of Hip.
Shoulder Fusion, for Polio Flail Shoulders; five-year Follow-up; Demonstration of Cases.
Follow-up on Shelf Operation, for Congenital Dislocation of Hip; Presentation of Cases. Recurrent Clubfoot; Demonstration of Cases Following Resection of Head of Talus Plus Transplantation of Anterior Tibial Tendon.
Demonstration of Cases Following Teres Major Transplantation for Obstetrical Palsy.

JEWISH HOSPITAL

8:00–10:00. *General Surgery.* Operative Clinic. PAUL W. ASCHNER and STAFF.
General Surgery. Operative Clinic. LEO S. SCHWARTZ and STAFF.

10:00–12:00. *Gynecology and Obstetrics.* Nonoperative Clinic:
Puerperal Hematomas of Vulva. PAUL PEDOWITZ.
Subcutaneous Heparin in Thromboembolic Disease in Gynecology and Obstetrics. HARRY J. GREENE.
A Study of Pelvic Drive in Obstetrics. EDWIN M. GOLD.
Hyaluranidase and Infertility. CHARLES BIRNBERG.
"Failed Forceps." ISADORE DAICHMAN, WILLIAM POMERANCE.
Studies with Gonadogen. SAMUEL A. WOLFE, IRWIN NEIGUS.

10:00–12:00. *Gynecology and Obstetrics.* Nonoperative Clinic:
Diagnosis and Treatment of Solitary Cyst of the Kidney by Aspiration and Injection. ABRAHAM D. SEGAL.
Treatment of Hydrocele by Sclerosing Agents. LOUIS H. BARETZ.
Periostitis and Ostitis Pubis Complicating Urologic Procedures. ZACHARY R. COTTLER, SAMUEL PARNASS.
Obstructive Uropathy in Children. PERRY KATZEN.
Serum Acid Phosphatase in the Diagnosis and Management of Carcinoma of the Prostate. ISADORE KIMMEL, PAUL W. ASCHNER.

KINGS COUNTY HOSPITAL

8:30– . *General Surgery.* (Long Island College Surgical Service)
Operative Clinics:
Gastric Resection. EDWARD P. DUNN.
Large Bowel Resection. CHARLES B. JONES.
For Gall-Bladder Disease. PHILIP E. LEAR.
Ligation of Patent Ductus Arteriosus. JOHN L. MADDEN.

8:30– . *Neurosurgery.* Operative Clinic: JEFFERSON BROWDER and STAFF.
Dorsal Cordotomy for Painful Phantom Foot. E. JEFFERSON BROWDER.
Sympathectomy for Arterial Hypertension. EVERETT CORRADINI.
Capsular Fiber Section for Parkinsonism. E. JEFFERSON BROWDER.
Dorsal Rhizotomy for Spasticity of Cerebral Palsy. FRANK TURNEY.

9:00– . *General Surgery.* Operative Clinic. JOSEPH TENOPYR and STAFF. Subject to be Announced.

9:00– . *Thoracic Surgery.* Operative Clinic:
Segmental Resection of the Lung. LEW A. HOCHBERG.

KINGS COUNTY HOSPITAL
LONG ISLAND COLLEGE DIVISION

8:30– . *General Surgery.* Operative Clinics: (Operating Pavilion–"B" Building).
Gastric Resection. EDWARD P. DUNN.
Large Bowel Resection. CHARLES B. JONES.
Gall Bladder and Common Duct Exploration. PHILIP E. LEAR.
Ligation Patent Ductus Arteriosus. JOHN L. MADDEN.

1:45– . *General Surgery.* Nonoperative Clinics (Nurses' Amphitheatre):
Diagnosis and Treatment of Lymphogranuloma Venereum, Anus, Rectum, and Colon. CHARLES B. JONES.
Paraduodenal Hernia, Report of Four Cases. PHILIP E. LEAR.
Cosmetic Incision for Excision of Benign Breast Tumors and for Suppurative Diseases of the Female Breast. GAETANOT, DE YOANNA.
Tetanus—A Surgical Problem. Experience with Five Hundred Cases in China. PHILLIPS F. GREENE.
Gastrojejunocolic Fistula, Six Case Reports. JOHN L. MADDEN.
Follow-up Results in Hip Nailing Operations in Femoral Neck. ARNOLD F. SAMMIS.

2:00– . *General Surgery.* Nonoperative Clinic: Subjects to be Announced.

2:00– . *General Surgery.* Nonoperative Clinic:
Diagnosis and Treatment of Lymphogranuloma Venereum of Anus, Rectum and Colon. CHARLES B. JONES.
Paraduodenal Hernia, Report of Four Cases. PHILIP E. LEAR.
Surgical Treatment of Gastrojejunocolic Fistula, Report of Six Cases. JOHN L. MADDEN.
Cosmetic Incision for Excision of Benign Tumors of the Breast and for Suppurative Mastitis. GAETANNO DE YOANNA.
End-Results in Hip Nailing for Fracture of the Femoral Neck. ARNOLD F. SAMMIS.
Tetanus as a Surgical Problem. PHILLIPS F. GREENE.

2:00– . *Neurosurgery.* Nonoperative Clinic:
The Cerebellar Hemangioblastomas. EVERETT CORRADINI.
Cysticercus Disease of the Brain. LESTER REED.
Surgery for Parkinson's Disease. E. JEFFERSON BROWDER.
Management of Fractures of the Spine with Spinal Cord Damage. FRANK TURNEY.
Subdural Hematoma. RICHARD GRIMES.
2:00– . *Thoracic Surgery.* Nonoperative Clinic:
Lung Abscess As Seen at the Kings County Hospital. ALFRED D. BICUNAS.
Pneumonolysis in Cases of Pulmonary Tuberculosis. EDWIN H. GRIFFIN.
Some Experiences in the Management of Chronic Empyema. ELGIE K. JOHNSON.
Paradoxical Respiration—Its Causes, Consequences and Treatment. LEW A. HOCHBERG.

LONG ISLAND COLLEGE HOSPITAL

11:00– . *Obstetrics and Gynecology.* Operative and Nonoperative Clinics, and Demonstrations. Members of the staff.
The Departments of Ophthalmology and Otolaryngology will conduct their programs at the Brooklyn Eye and Ear Hospital.

METHODIST HOSPITAL

9:00–12:00. *Obstetrics and Gynecology.* Operative Clinics (Buckley Building—8th Floor):
Vaginal Hysterectomy. Total Hysterectomy. (Other Operative Procedures to be Scheduled Later). G. H. DAVIS and STAFF.
9:00–12:00. *Obstetrics and Gynecology.* Demonstrations (Maternity Building—Main Floor):
Ball Technique in X-Ray Mensuration of Pelvis. BUTLER GOYANES.
Cord Transfusion. B. MAYES.
Inspection of Clinics, Wards and Delivery Rooms. RESIDENT STAFF.
Maternal Mortality and Morbidity in Obstetrics. SEISMAN.
2:00– . *Obstetrics and Gynecology.* Nonoperative Clinic:
G. H. DAVIS, Chairman
Fibroids and Ovarian Tumors in Pregnancy. SHEPLER.
Fetal Mortality in Prolonged Labor. GLYNN.
Leimyosarcoma; Contract with Cellular Myofibromyomas. FRENCH, HOWE.
Ablatio Placentae. BEIL.
Manual Removal of Placenta. H. MAYES.
Anesthesia in Cesarean Section. H. ACKEN, JR.
Wedge Resection of Ovary for Polycystic Disease. S. C. HALL.

CLINICS IN NEW YORK HOSPITALS

Friday

BELLEVUE HOSPITAL—FIRST (COLUMBIA UNIVERSITY) SURGICAL DIVISION

8:00–12:00. *Thoracic Surgery.* Operative Clinic (C & D Building, 5th Floor Operating Room): FRANK B. BERRY and STAFF.

BELLEVUE HOSPITAL—THIRD (NEW YORK UNIVERSITY) SURGICAL DIVISION

8:00–12:00. *Anesthesia.* Demonstration (C & D Operating Rooms, 5th Floor, C & D Building): Anesthesia in Thoracic Surgery. E. A. ROVENSTINE and STAFF.
A.M. *Radiology.* Demonstrations (I & K Building, Ground Floor): IRA I. KAPLAN and STAFF.
Radiation Therapy as an Adjunct Method of Treatment in Genitourinary Neoplasm Alternate.

BELLEVUE HOSPITAL—FOURTH (NEW YORK UNIVERSITY) SURGICAL DIVISION

8:00–9:30. *General Surgery and Fractures.* Operative Clinics. (Operating Rooms K-5 & K-6): ARTHUR MCQUILLAN and STAFF.
Thyroid Surgery. ARTHUR S. MCQUILLAN (Operating Room A).
Stomach Surgery. J. WILLIAM HINTON. (Operating Room B).
Intestinal Surgery. LESTER BREIDENBACH (Operating Room C).
Gall-Bladder Surgery. EDWARD V. DENNEEN (Operating Room D).
Smith-Petersen Nailing for Fracture of Neck of Femur. KENNETH M. LEWIS (Bone Room K-6).
10:00–12:00. *General Surgery and Fractures.* Nonoperative Clinics (I & K Building, Stewart Amphitheatre, Ground Floor): End-Results. ARTHUR S. MCQUILLAN and STAFF.
Thyroids. ARTHUR S. MCQUILLAN.
Peptic Ulcers. J. WILLIAM HINTON.
Fracture of the Neck of the Femur. KENNETH M. LEWIS.
Stricture of Rectum Due to Lymphogranuloma Venereum. LESTER BREIDENBACH.
Gall-Bladder Disease. EDWARD V. DENNEEN.

BETH ISRAEL HOSPITAL

9:00–12:00. *Orthopedic Surgery.* BALENSWEIG and STAFF.
2:00–5:00. *Obstetrics.* LANGROCK, SCADRON.

FLOWER AND FIFTH AVENUE HOSPITALS

9:00–10:00. Water Balance, etc. FRANCIS D. SPEER, JOHN HERRLIN.
Lyophilized Amino Acids. MICHAEL G. MULINOS.
Relationship of Amino Acid Composition of Foods. R. J. BLOCK, H. H. MITCHELL.
11:00–12:00. The Prevention of Renal Complications by Therapy with Mixtures of Sulfonamides—or—Phthalys Sulfacetamide in Surgery of Colon. DAVID LEHR.
2:00–3:00. Presentation of Plans for Resident Training in Surgery. JAMES M. WINFIELD.

HARLEM HOSPITAL

9:00–12:00. Abdominal Catastrophies—Operative and Nonoperative Clinic and Ward Rounds. B. N. BERG, A. A. ZINGARO, J. L. WILSON, A. DEL. MAYNARD.
2:00–5:00. Clinico-Pathological Conference. L. T. WRIGHT, S. WEINTRAUB, and STAFF.

HOSPITAL FOR JOINT DISEASES

9:00–12:00. *General Surgery.* Operative Clinic: Carcinoma of Colon. Carcinoma of Rectum. Nonoperative Clinic: Intra-Abdominal Resection with Anastomosis for Carcinoma of the Rectum. A. J. BELLER.
2:00–4:00. *Neurosurgery.* Operative Clinic: Operations of Brain and Spinal Cord. ABRAHAM KAPLAN.

HOSPITAL FOR SPECIAL SURGERY

8:30–12:00. *Orthopedic Surgery.* Adult Service.

2:00–5:00. *Orthopedic Surgery.* Operative and Nonoperative Clinic:
Osteoid Osteoma. MILTON HELPERN, RAYMOND LEWIS.
Bone Grafts without Internal Fixation. PETER RIZZO.
Bridging of Defects of Long Bones of the Extremities. JOHN FLANAGAN.
The Bone Bank. PHILIP D. WILSON.
Spine Fusion with Internal Fixation. L. RAMSAY STRAUB.
Problems in the Treatment of Scoliosis. JOHN R. COBB.

LYING-IN HOSPITAL

(See New York Hospital)

MANHATTAN EYE, EAR AND THROAT HOSPITAL

9:30– . *Otolaryngology.* Demonstration: Audiometry; Selection and Fitting of Hearing Aids; Retraining Residual Hearing. WHITEHURST, NERENBERG.
10:00– . *Ophthalmology.* Demonstration: Corneal Grafting Technique on Rabbits. H. M. KATZIN.
10:00– . *Neurosurgery.* Operative Clinic. Facial Nerve Graft:
Operation and Demonstration of Postoperative Results. T. G. TICKLE.
2:00– . *Otolaryngology.* Operative Clinic. Tonsil Surgery; Preoperative and Postoperative Procedure. R. J. BELLUCCI.
2:00– . *Ophthalmology.* Orthoptic Clinic. F. C. KEIL, JR., E. KNAUBER.

MEMORIAL HOSPITAL

9:00–10:30. *Tumor Surgery.* Nonoperative Clinic: End-Results Following Abdominoperineal Resection for Cancer of the Rectum; Treatment of Cancer of the Colon; Management of Squamous Cancer of the Anus and the Rectum.
10:30–12:00. *Tumor Surgery.* Nonoperative Clinic: End-Results in the Treatment of Cancer of the Stomach; a Study of Over 1000 Cases. End-Results in the Treatment of Malignant Melanomas; a Study of Over 900 Cases.
2:00–3:00. *Thoracic Surgery.* Nonoperative Clinic: Asymptomatic Thoracic Tumors: End-Result in Surgically Treated Cases of Carcinoma of the Cervical Esophagus. End-Results in Surgically Treated Cases. WATSON.
3:00–4:00. *Tumor Surgery.* Nonoperative Clinic: End-Results in Treatment of Bone Tumors. COLEY.
4:00–5:00. *Tumor Surgery.* Discussion: Cancer in Children; Presentation of Followed Cases. DARGEON.

METROPOLITAN HOSPITAL

9:00–12:00. *General Surgery.* Operative Clinic: Surgery of Stomach and Duodenum. JAMES M. WINFIELD and STAFF.
Indications. EDWARD J. MCCABE.
Vagotomy. JAMES M. WINFIELD.
Duodenal Closure and Complications. KENNETH C. PEACOCK.
Surgery of Gall Bladder and Pancreas. KENNETH C. PEACOCK.
Retroperitoneal Tumors. KENNETH C. PEACOCK, JOHN SNIDER.
Peritoneal Spaces. JOHN HERRLIN.
2:00–4:00. *Plastic and Faciomaxillary Surgery.* Operative and Nonoperative Clinic. DAVID M. MAYER, JOHN F. FORD.

MOUNT SINAI HOSPITAL

8:30–12:00. *Genitourinary Surgery.* Operative Clinic: Kidney Operation. LEO EDELMAN.
Nonoperative Clinic: Carcinoma in a Horseshoe Kidney. GORDON D. OPPENHEIMER.
Bladder Neck Obstruction in Young Individuals. MOSES SWICK.
Perirenal Insufflation. WILLIAM MENCHER.
Enuresis Due to Ectopic Ureter. H. EVANS LEITER.
2:00–5:00. *Neurosurgery.* Nonoperative Clinic:
Long Time Follow-up in Some Neurosurgical Cases. Case Presentations. ABRAHAM KAPLAN.
Correlation of X-Ray Findings and Clinical Picture. B. SCHLESINGER.
Dumbbell Tumor of the Spine. IRA COHEN.
Cranioplasty, Motion Picture Demonstration. S. GROSS.

NEUROLOGICAL INSTITUTE

(See Presbyterian Hospital)

NEW YORK EYE AND EAR INFIRMARY

10:00–12:00. *Otolaryngology.* Demonstration: Anatomical Specimens. E. BURCHELL.
2:00–4:00. *Otolaryngology.* Discussion of Pathology with Lantern Slides. D. S. D. JESSUP.
The routine clinics of the New York Eye & Ear Infirmary will be held as usual during this period; all Fellows of the American College of Surgeons are cordially invited to attend.

NEW YORK HOSPITAL

9:00– . *Orthopedic Surgery.* Operative Clinic. FREDERICK LEE LIEBOLT.
2:00– . *Orthopedic Surgery.* Nonoperative Clinic. FREDERICK LEE LIEBOLT and ASSOCIATES.
Volkmann's Paralysis Prevented by Sympathetic Block. ARTHUR CONSOLE.
Reconstruction Surgery of the Hand (Lantern Slides). FREDERICK L. LIEBOLT.
Massive Onlay Bone Grafts for Ununited Fractures. PRESTON WADE.
Conservative Treatment of Table Fractures of the Tibia. BERNARD MAISEL.
End-Results in Treatment of Fractures of the Neck of the Femur by Moore Nails. NELSON CORNELL.
2:00– . *Otorhinolaryngology.* Operative Clinic: Surgery of the Oropharynx and Nasopharynx. THOMAS GARRICK.
2:00– . *General Surgery.* FRANK GLENN and STAFF.
The Chemistry of Penicillin and Streptomycin. VINCENT DU VIGNEAUD.
Toxicity of Streptomycin. WALSH MCDERMOTT.
Treatment of Pulmonary Tuberculosis by Streptomycin. CARL MUSCHENHEIM.
Use of Streptomycin in Treating Surgical Pulmonary Tuberculosis. CRANSTON HOLMAN.
Adult Tissue Extract in Wound Healing. JAMES DINGWALL.

NEW YORK HOSPITAL
LYING-IN HOSPITAL

11:00– . Obstetrical and Gynecological Staff Rounds.
A.M.– *Obstetrics and Gynecology.* Operative Clinic: Gynecological Operations by Resident Staff.
PM– *Obstetrics and Gynecology.* Operative and Nonoperative Clinic:
Cryptomenorrhea—Congenital and Acquired. THOMAS L. BALL.
Results of an Operation for Urinary Incontinence. ANDREW A. MARCHETTI, VICTOR MARSHALL.

Pregnancy Following Outlet Operation. WILLIAM FINN.
Studies on Patients with Hydramnious During the Past Fifteen Years. PAUL E. MUELLER.
End-Results of the Treatment of Carcinoma of the Endometrium. ANDREW A. MARCHETTI, JOHN E. MCALLISTER.
Radiological Survey of Breeches. H. L. WILCOX.

NEW YORK ORTHOPEDIC DISPENSARY AND HOSPITAL

8:00– . *Orthopedic Surgery.* Operative Clinic. ALAN DE FOREST SMITH and STAFF.
1:30– . *Orthopedic Surgery.* General Orthopedic Clinic. HALFORD HALLOCK and STAFF.

NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL

9:00–10:30. *Neurosurgery.* Operative Clinic (Amphitheatre, 6th Floor): Surgery in Hypertension.
10:30–12:00. *Neurosurgery.* Operative Clinic: Diseases of the Vascular System.
2:00–5:00. *General Surgery.* Operative Clinic (Amphitheatre, 6th Floor).

PRESBYTERIAN HOSPITAL

8:00– . *General Surgery.* Operative Clinic: Surgery of The Large Bowel. DAVID C. BULL, ROBERT S. GRINNELL, LOUIS M. ROUSSELOT, HENRY S. COOPER.
Sympathectomy for Hypertension. RICHMOND L. MOORE.
Vagectomy for Marginal Ulcer. ROBERT H. WYLIE.
Wiring of Arteriosclerotic Abdominal Aneurysm. ARTHUR H. BLAKEMORE.
2:00–4:00. *General Surgery.* Nonoperative Clinic: Physiology of Peritonitis. JOHN S. LOCKWOOD.
Prevention of Wound Infection and Peritonitis with Sulfamylon and Streptomycin. Case Demonstration. EDWARD L. HOWES.
Laboratory Experiments and Clinical Results with Bacitracin. FRANK L. MELENEY.
Acute Appendicitis Over a Thirty Year Period at a University Hospital. RUDOLPH N. SCHULLINGER.

PRESBYTERIAN HOSPITAL NEUROLOGICAL INSTITUTE

9:00–12:00. *Neurosurgery.* Operative Clinic: Cases Previously Shown Clinically at the Tuesday Morning Staff Conference.

PRESBYTERIAN HOSPITAL SLOANE HOSPITAL FOR WOMEN

9:30– . *Obstetrics and Gynecology.* Operative Clinic: Wertheim Operation for Carcinoma of the Cervix. HOWARD C. TAYLOR, JR.
2:00– . *Obstetrics and Gynecology.* Nonoperative Clinic: Trends in the Treatment of Uterine Carcinoma. HOWARD C. TAYLOR, JR.
3:00– . *Obstetrics and Gynecology.* Nonoperative Clinic: Rh Factor in Obstetrics. J. GREER.
4:00– . *Obstetrics and Gynecology.* Nonoperative Clinic: Late Follow-up Results in the Toxemia of Pregnancy. A. J. TILLMAN.

PRESBYTERIAN-NEW YORK ORTHOPEDIC HOSPITALS

Fracture Service

9:00–1:00. *Fractures and Traumatic Surgery.* Fracture Service Grand Rounds and Conference.
2:00–4:00. *Fractures and Traumatic Surgery.* Nonoperative Clinic:
Rôle of Sympathetic System in the Surgery of Trauma.
The Treatment of Shock Coincident with Trauma. JOHN SCUDDER.

ROOSEVELT HOSPITAL

9:00– . *General Surgery.* Nonoperative Clinic: Tumors of the Stomach With Colored Photographs of Specimens. HOWARD A. PATTERSON.
Demonstration of Stomach Tumor Specimens. WALTER BRANDES.
Some Late Results of Conservative Treatment in Vascular Problems. GRANT P. PENNOYER.
The Observed Effect of Various Drugs on Intestinal Activity. (Motion Picture Demonstration). DAVID M. WEEKS.

ST. VINCENT'S HOSPITAL

9:00– . *General Surgery.* Operative Clinics and Demonstration: Cases of Trauma Fractures. MAGUIRE, FRANK CONWAY, LOUIS SANMAN, JOHN A. FALLON, MAURICE O'SHEA.
9:00– . *General Surgery.* Tumor Clinic and Follow-up. GEORGE R. STUART and Tumor Committee.
9:00– . *Neurosurgery.* Nonoperative Clinic: The Results of Conservative Treatment of Acute Head Injuries. FRANKLIN ROBINSON.
2:00– . *Pathology.* Display of Fresh Pathological Material; of Systemic Diseases by Kodachrome Slides; of Fixed Specimens. ROTTINO and ASSOCIATES.

SLOANE HOSPITAL FOR WOMEN

(See Presbyterian Hospital)

VETERANS ADMINISTRATION HOSPITAL

9:00– . *General Surgery.* Operative Clinic. CARNES WEEKS, JOHN E. SULLIVAN.
9:00– . *Thoracic Surgery.* Operative Clinic. WALTER CRANDALL, AARON HIMMELSTEIN, RICHMOND MOORE.
9:00– . *Orthopedic Surgery.* Operative Clinic. SYDNEY EICHENHOLTZ, ROBERT PATTERSON, FRANK E. STINCHFIELD.
9:00– . *Head and Neck Surgery.* Operative Clinic. EDGAR L. FRAZELL.
9:00– . *Plastic Surgery.* Operative Clinic. HERBERT CONWAY.
9:00– . *Radiation Therapy.* Exhibit and Presentation: Bronchogenic Carcinoma-Analysis of Diagnosis and Therapy with End-Results, A Study of 600 Cases. ARCHIE SHEINMEL, BERNARD ROSWIT, JOSEPH STEIN and RESIDENT STAFF.
9:30–11:30. Medical Rehabilitation Clinic. HARRY KESSLER, KARL HARPUDER, IRWIN D. STEIN, BERNARD STOLL, JACOB BYER.
11:00 . *General Surgery.* Nonoperative Clinic: Thoracolumbar Sympathectomies. CARNES WEEKS.
1:30– . *Plastic Surgery.* Conference: HERBERT CONWAY, CLARENCE R. STRAATSMA, CORNELIUS J. KRASSL, ROBERT H. CLIFFORD and RESIDENT STAFF.
3:30– . *Anesthesia Section.* Conference: Endotracheal Anesthesias. Electrocardiographic Changes During Intrathoracic Surgery. EMERY ROVENSTINE, HAROLD BISHOP, CHARLES BURSTEIN, and RESIDENT STAFF.

EXHIBITS

Anesthesia Section
Bronchogenic Carcinoma: Review of 600 Cases
Intracranial Neoplasms
Residency Training Program
Organization of Surgical Division
Results of Vagus Resection
Pathology Section
Medical Illustrations Laboratory
Plastic Surgery
Prosthetic Appliances

CLINICS IN BROOKLYN—LONG ISLAND HOSPITALS

Friday

CUMBERLAND HOSPITAL

9:00–12:00. *General Surgery.* Operative Clinic: Cancer and Prostate. HOWARD T. LANGWORTHY and STAFF.
Orchiectomy for Prostatic Metastases. Late Results.
Cancer of Bladder with Transplantation of Ureter. Late Results. LEO DREXLER and STAFF.
2:00–5:00. Nonoperative Clinic. Diagnosis and Management of Ureteral Calculus; Results in 255 Cases. FRANK C. HAMM.
Late Results in Thrombophlebitis and Phlebothrombosis. WARD CEILLY.
Tumors in Children. HERMAN CHARACHE.
Convulsions During Anesthesia. Late Results.
Late Results in Surgical Jaundice.

KINGS COUNTY HOSPITAL

9:00– . *Gynecology.* (Kings County Division) Operative Clinics. GARLICK, MCGOLDRICK and MUELLER.
9:00– . *Thyroid Surgery.* Operative Clinic: Thyroidectomy. ANTHONY PIRUNDINI.
9:00– . *General Surgery.* Nonoperative Clinic: JOHN F. RAYCROFT and STAFF.
Cholesystectomy in the Acute Gall Bladder as Compared with Cholesystectomy in the Chronic Gall Bladder. IRWIN P. TRAIN.
Use of the Miller-Abbott Tube As an Aid in Intestinal Surgery. JOHN F. RAYCROFT.
Review of Gastric and Duodenal Surgery. HARVEY F. POTTER.
Fracture of the Neck of the Femur—Five-year Study with Follow-up. VINCENT S. MAGGIO.
Case Report. Congenital Idiopathic Dilatation of the Common Bile Duct. JOHN F. RAYCROFT.
Review of Amputations of the Lower Extremities. THOMAS W. HYNES.
Review of Acute Appendicitis. PETER FIORE.
Review of Large Bowel Surgery. BERNARD J. FICARRA.
Therapy of Peripheral Vascular Disease. C. BURLING ROESCH.
10:00– . *Thyroid Surgery.* Nonoperative Clinic: Use of Propyl Thiouracil.
2:00– . *Gynecology.* Nonoperative Clinic: Follow-up of Gynecologic Malignancies. JOSEPH MCGOLDRICK.

LONG ISLAND COLLEGE HOSPITAL

12:00– . *General Surgery.*
Operative Program. EMIL GOETSCH and STAFF.
Fractures and Other Trauma. S. POTTER BARTLEY, HAROLD LAROE.
Diagnostic and Therapeutic Nerve-Blocks. PAUL ANSBRO.

METHODIST HOSPITAL

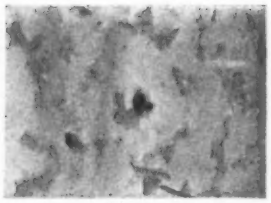
9:00–12:00. Tumor Clinic: (Late Results). PIERRE A. RENAUD, Moderator, and Hospital Staff.

THE CLINICAL CONGRESS TECHNICAL EXHIBITION

LEADING manufacturers of and dealers in surgical instruments, hospital apparatus and supplies, diagnostic and therapeutic apparatus, pharmaceuticals, and publishers of medical and surgical books will be represented in the Technical Exhibition at the Waldorf-Astoria Hotel, New York, September 8–12, 1947:

Exhibitors

Abbott Laboratories, North Chicago
Acme Engineering Co., Inc., Greensboro, N. C.
A. S. Aloe Company, St. Louis
American Cystoscope Makers, Inc., N. Y.
American Hospital Supply Corp., Evanston, Ill.
American Safety Razor Corp., Brooklyn
American Sterilizer Company, Erie, Pa.
Ames Company, Inc., Elkhart, Ind.
D. Appleton-Century Company, Inc., N. Y.
Armour Laboratories, Chicago
The Gordon Armstrong Company, Cleveland
Austenal Laboratories, Inc., N. Y.
C. R. Bard, Inc., N. Y.
Bard-Parker Company, Inc. Danbury, Conn.
W. A. Baum Company, Inc., N. Y.
Rudolph Beaver, Waltham, Mass.
Becton, Dickinson & Co., Rutherford, N. J.
Julius Berbecker & Sons, Inc., N. Y.
The Borden Company, N. Y.
Bristol Laboratories, Inc., N. Y.
Burdick Corp., Milton, Wis.
Cameron Surgical Specialty Co., Chicago
Wilmot Castle Co., Rochester, N. Y.
Ciba Pharmaceutical Products, Inc., Summit, N. J.
Clay Adams Company, Inc., N. Y.
Coca-Cola Co., Atlanta
Cochrane Physicians' Supplies Inc., N.Y.
Crescent Surgical Sales Co., Inc., N. Y.
Curvlite Products, Inc., Port Chester, N. Y.
Cutter Laboratories, Chicago
Davis & Geck, Inc., Brooklyn
F. A. Davis Co., Philadelphia
Davol Rubber Co., Providence
J. A. Deknatel & Son, Inc., Queens Village, L. I.
De Puy Mfg. Co., Warsaw, Indiana
Duke Laboratories, Inc., Stamford, Conn.
E & J Manufacturing Co., Glendale, Calif.
Ethicon Suture Laboratories, New Brunswick, N. J.
General Electric X-Ray Corp., Chicago
General Foods Corporation, N. Y.
Grune & Stratton, Inc., N. Y.
Gudebrod Bros. Silk Co., Inc., N. Y.
Fred. Haslam & Co., Inc., Brooklyn
Paul B. Hoeber, Inc., N. Y.
Hospital Liquids, Inc., Chicago
Iodine Educational Bureau, N. Y.
Johnson and Johnson, New Brunswick, N. J.
Jones Metabolism Equipment Co., Chicago
Lea & Febiger, Philadelphia
Lederle Laboratories Division, N. Y.
Liebel-Flarsheim Co., Cincinnati
Eli Lilly and Co., Indianapolis
J. B. Lippincott Co., Philadelphia
MacGregor Instrument Co., Needham, Mass.
Macmillan Company, N. Y.
Mead Johnson & Co., Evansville, Ind.
Medical Bureau, Chicago
Medical Film Guild, N. Y.
Merck & Company, Rahway, N. J.
C. V. Mosby Company, St. Louis
V. Mueller & Co., Chicago
The New York Medical Exchange, N. Y.
Parke, Davis & Company, Detroit
Picker X-Ray Corp., N. Y.
George P. Pilling & Son Co., Philadelphia
Radium Chemical Company, Inc., N. Y.
Radium Emanation Corp., N. Y.
Richards Manufacturing Co., Memphis
Sanborn Company, Cambridge, Mass.
W. B. Saunders Company, Philadelphia
Schenley Laboratories, N. Y.
Schering Corporation, Bloomfield, N. J.
Shampaine Company, St. Louis
Sharp & Dohme, Inc., Philadelphia
Shay Medical Agency, Chicago
Siebrandt Mfg. Co., Kansas City, Mo.
J. Sklar Manufacturing Co., Long Island City
Spencer, Inc., New Haven, Conn.
E. R. Squibb & Sons, N. Y.
Frederick Stearns & Co., Detroit
Surgery, Gynecology and Obstetrics, Chicago
Swift & Company, Chicago
Taylor Instrument Co., Rochester, N. Y.
Technicon Co., N. Y.
Charles C. Thomas, Springfield, Ill.
Tower Company, Inc., Seattle
Universal Products Corp., Norristown, Pa.
Upjohn Company, Kalamazoo, Mich.
Wallace & Tiernan Products, Inc., Belleville, N. J.
Edward Weck & Co., Inc., Brooklyn
Williams & Wilkins Co., Baltimore
Winthrop Chemical Co., Inc., N. Y.
Max Wocher & Son Company, Cincinnati
Woodward Medical Personnel Bureau, Chicago
Zimmer Manufacturing Co., Warsaw, Ind.



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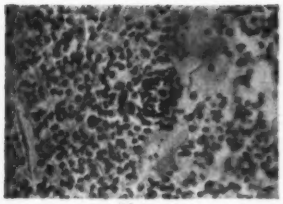

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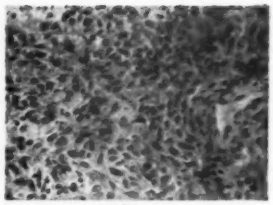

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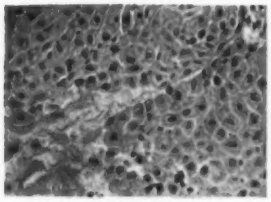

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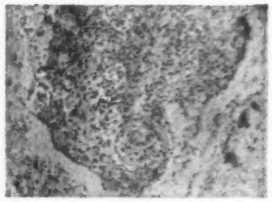

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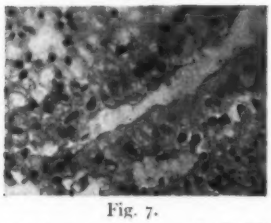

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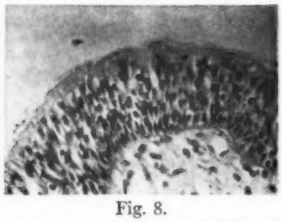

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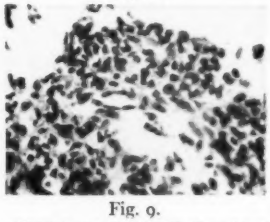

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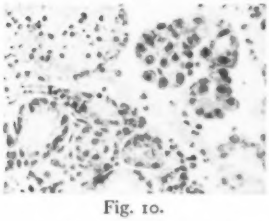

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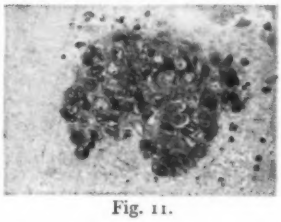

Fig. 11.

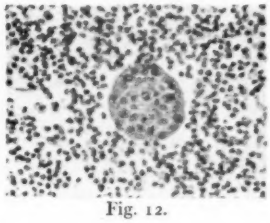

Fig. 12.

Cytologic Recognition of Cancer in Exfoliated Material from Various Sources.—
Warren C. Hunter and Howard L. Richardson